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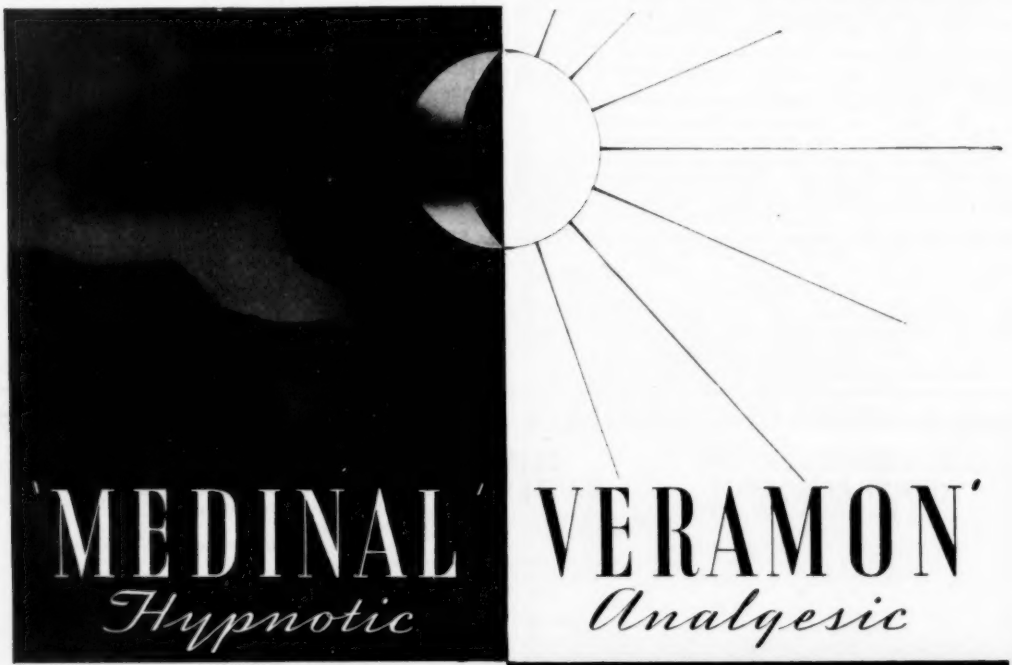

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EFFECT OF WAR ON CIVILIAN POPULATIONS *

BY MAURICE WRIGHT, O.B.E., M.D. Edin.
PHYSICIAN TO THE TAVISTOCK CLINIC, LONDON

Is there really any such thing as the effect on the population as a whole which can be put in clear terms? A population, however dense or large, is made up of individuals, and no two individuals react exactly in the same way to the same situation.

Take first the smallest group—the family. Under war conditions every member of the family will react differently according to age, sex, position in the family, and so on. If this is true of the smallest unit, the family, then it is also true of the larger groups which make up the population. The reaction will be different in urban and rural areas, different according to the density of the population and the real or imaginary threat to life. All we can really say about the reaction of a civilian population to war conditions is that in such areas the overt behaviour of a large number of the population seemed to give evidence of such and such an alteration in mood and behaviour.

EXPERIENCE IN 1914–18

I do not think that the sense of anxiety and apprehension was ever so widely spread as it was at the very outbreak of war in 1914. It was apprehension rather than fear—largely, I think, because war was something unknown and no one in the civilian population knew what modern war would be like. Imagination therefore could run riot, unchecked by knowledge or experience. It was for this reason probably that it was in the early days of the war that rumour played so large a part in adding to the general sense of apprehension. Because of the absence of the critical faculty, which must be based upon knowledge of facts, the general mass of the population was perhaps more suggestible than at any time during the war. Take, for instance, the passage of enormous numbers of Russian troops through London at dead of night, which was accepted as a fact by the mass of the population. Spies were seen to be signalling at night to German submarines by thousands of people all round the coast. The Prime Minister was in the pay of the Germans. The myth of the Angels of Mons was widely accepted. In the early days and the early weeks of the war no rumour was too fantastic to be accepted.

This condition of most of us, then, was not so much that of acute anxiety as of apprehension. Anxiety and fear began to appear later when the facts and realities of war began to emerge.

Actually, the first cases that I saw of really acute anxiety were cases where the threat was not to life but to economic security. As you will remember, a moratorium was declared on the outbreak of war; the Stock Exchange was closed and no one could foresee what would happen to the whole economic structure of the kingdom during the first months of war. I saw personally cases of complete nervous and even mental breakdown amongst bankers, stock-brokers, and financiers. It was not the threat to life, it was the threat to economic security which caused the breakdown, and I think this must be borne in mind when thinking of the reaction of the civilian population to war. The loss of property, the threat to economic security, is vastly more important to many than the threat to life. I am afraid it is a fact that many more will expose themselves to danger to save property than to save another life.

After the first few weeks of war, during which apprehension and increased suggestibility were perhaps the main features, new attitudes began to emerge. I am no politician and do not attempt to justify or deny the reality behind these things, but as the facts of war, the realities of the situation, became clearer, then the idea—the Ideal, if you like—which had brought us into war became clearer to the masses of the population. This was the reason for the wave of enthusiasm which swept through the country—enthusiasm to serve to make any sacrifice of life or property or of the lives of those nearest and dearest. By the masses of the people the war was felt to be a just one, terrible but inevitable. During the four years of war the Ideal may have become somewhat tarnished at times, but I think it was there throughout, and enabled the mass of the people to bear the very great sacrifices and hardships without loss of morale or sense of defeat.

MENTAL DEFENCES AGAINST WAR ANXIETY

Although manifest anxiety seemed to lessen in the general population as they accepted and adjusted themselves to the realities of the war, it is important to notice that the anxiety was still there, although at this stage it had been driven underground, or suppresed, as we would say in our psychological jargon. Individuals with suppressed anxiety, in direct ratio to the amount of suppressed anxiety, automatically adopt various changes in outlook and attitude which act as "mental defences" against its return into consciousness. As the amount of suppressed anxiety increases, these mental defences become more evident. As Dr. Ernest Jones has stated (in "Psycho-Analysis and the War Neuroses") the mental defences against war anxiety, the process of readaptation in regard to war, consists of two distinct sides: on one hand an extensive release of previously tabooed tendencies—such as cruelty, licence in sexual morality, drink, spending of money—and on the other hand the acquisition of strict discipline and control along lines widely different from those of peace-time.

Both these aspects of "mental defence" or readaptation were evident in the last war, in the civilian population as well as in the fighting forces, and they will with certainty be evident in any future war. To my mind, they are both defences against the overwheming anxiety which might otherwise be felt.

OVERTHROW OF TABOOS

To take the first aspect of these defences—the release of normally tabooed tendencies. I wonder if any of you remember the release which was often manifest, especially in the early days of the war, of cruel and sadistic thought and speech in normally gentle people?

I remember very well dining with a particular friend at his house early on in the war. The ladies present were all doctors' wives, intelligent, cultured folk, without, you would think, a grain of hatred or cruelty in their disposition; and yet during dinner the main topic of conversation among the women—not the men—was the planning of tortures or punishments they would like to see perpetrated on German

* Abridged from a lecture delivered at the Tavistock Clinic on Jan. 12, 1939, introducing a course entitled Neuroses in Wartime.

prisoners. Belgian atrocities, true or false, were then fresh in our minds, but I have never seen such an appalling release of primitive hate, cruelty, and sadism as was evinced by those normally gentle folk. This was not an isolated instance. The release of sadism was evident in its most primitive form in the press and in the conversation of ordinary people—most evident, I think, in women, in whom the related aggressive instincts are more deeply repressed in normal times and situations.

In the last war—in fact, I think in all wars—there was plenty of evidence that there is a lowering of the accepted standards of sexual morality in both sexes, and here again I believe that in the majority of cases the free sexual indulgence was not because of the increased opportunity so often produced by war conditions, but a form of defence against anxiety, a narcotic if you like. Most of you will have seen, as I saw, many examples of young married women whose reaction to the death of their husbands was to throw themselves into a frenzy of sensual and sexual indulgence. In most of them, of course, since this reaction can only dull the pain of bereavement and anxiety, this was a temporary phase—a narcotic, as was said. The same applies to drink and extravagance. All of us know many chronic alcoholics in whom the beginning of the condition can be attributed to the circumstances of war. "Eat, drink and be merry, for tomorrow we die" must be and will be, I think, the philosophy of some of the civilian population in war conditions. I am sure however that it will only be a small section of the general population who will take this road; and many—even if they take it for a short time—will retrace their steps and, as a defence against their anxiety, get their feet firmly on the harder but better road of discipline.

SELF-CONTROL

And now about this second road—the acquisition of a strict discipline and self-control along lines widely different from those of peace-time. This, of course, is evident enough in the fighting forces, where the strictest of discipline is necessary under war conditions, not only for efficiency but also in actual battle, as a defence against anxiety and the spread of panic fear and all that that entails. In the last war it was also true of the civilian populations and it will be increasingly necessary if we have to face another war, perhaps directed in the main against the civilian population. Last time we saw on all sides the self-imposition of this discipline in nursing services, ambulance services, voluntary policemen, firemen, munition-workers, voluntary organisations of all kinds. The people in these services were drawn from all classes of society, and all of them accepted discipline, self-control, and long hours of work quite alien to their peace-time occupations. For many there was no question of economic gain, but many found in the discipline and the work, the solution—or at any rate a partial solution—of their own personal problem of finding a defence against anxiety. With this self-imposed discipline there came a building-up of personal ideals, however hard and monotonous the work; this is in contrast to the destruction of personal ideals and self-esteem which is the result of taking the other road, the flight into sensuality.

THE LONDON AIR-RAIDS OF THE LATE WAR

Now to pass on to the effect of the actual air-raids on the civilian population. I think I was in London for the vast majority of the air-raids and in most of them I was in a hutment hospital for shell-shocked officers in Kensington. The raids were often unpleasant and definitely frightening, not only because of the noise—the most frightening thing unless you are used to it—but also because there was a real sense of danger. There were shell fragments falling and breaking slates overhead, nose-caps falling near-by, and bombs exploding at no great distance. The patients were the worst cases of shell-shock and were all in single rooms. Nurses went from room to room trying to keep them steady, most of them young and inexperienced V.A.D.'s, but I never saw a sign of hysteria or panic amongst the staff, although they were surrounded by panic and hysteria amongst the patients.

This is, I think, a fair sample of how a large section of the civilian population reacted when they were under discipline, had definite work to do, and were living ordered lives. The raids themselves could be borne well, but after a series of raids there would be a proportion of breakdowns.

In the crowded districts of the East End of London, where bombing was more severe, there was panic and some hysteria—never very serious but bad enough. Here there were different standards of self-discipline and self-control, even in peace-time, and little opportunity for flight. I do not believe, as some do, that every alien is necessarily a coward. But aliens in any country do not stand war conditions so well as nationals, just because they are aliens. For the alien there is less motive for restraining the free expression of the self-preserving instinct.

One thing is, I think, significant. Although there was some panic and hysteria in certain areas, I do not think the civilian hospitals had a great many cases of psychiatric casualties. After the war all of us saw many cases of civilians who had been gradually breaking down as a result of the war. Raids, personal anxieties, economic stress, malnutrition, and overwork—all left their mark on the population for a generation. Of one thing we can be sure, even from our experience of the last war—however powerful our defences, however well-organised the nation, war will take a terrible toll of civilian population, not only in physical injuries, but through the stress of long-continued fear and anxiety affecting not only the mind and feelings, but every organ and function of the body.

EFFECTS OF INTENSIVE ATTACK

It is to my mind impossible to forecast the effect of a war in which the civilian population in large cities like London was subjected to incessant aerial bombardment, with appalling destruction of life and property. I do not believe we can learn all that we need from the reports at present available of the effect of aerial bombardment in places like Barcelona or Madrid or a Chinese town. We are told that in Barcelona the population has been amazingly tolerant of air-raids and accepts them with amazing courage and fortitude. We are told that this is the case because the Spanish people are more callous than we are to scenes of carnage and destruction, and that the courage and fortitude of the population is due to the fact that they have implicit faith in the justice of the cause for which they are fighting, and in their government, and feel that everything is being done that can be done.

No single observer can see more than a single section of the community, and so much that I have heard and read is so often politically biased on one side or the other that I doubt very much whether we have got in any way a true picture of the effect of war on the civilian population in either Spain or China. One single and extremely significant fact has

been told us on good authority and must be recognised —the admissions to mental hospitals in Catalonia have trebled since the outbreak of the war in Spain.

On the one hand, there can be heard the voice of those who profess to believe, from a study of our history, that widespread psychological breakdown is unlikely. On the other, it has been suggested that because we are a capitalist country with class hatred and a government swayed by vested interests, our civilian population will get out of hand under the stress of modern war, and there will be mass hysteria, mass panic, and a complete breakdown of our civilisation—a grim picture, and to my mind extremely unlike the English people as I know them. I can quite conceive that there will be panic and hysteria. But both panic and the hysteria seen in groups or crowds are short-lived reactions, as we saw in the last war. Under terrific bombardment whole battalions succumbed to panic and ran back, but in almost every case they were rallied behind the lines and went forward again steadily into the fighting line free from panic. I believe this will hold good with the civilian population. There will be many who will panic, many who will have hysteria, but the majority of them will recover and carry on.

It may be helpful to define panic—it is an unusual fear reaction brought about by any intense and sudden stimulus without definite relation to the danger of the situation. It may result from a sudden noise, sudden darkness, an intense light, for example. All action is either completely paralysed, or more commonly, purposeless action may occur, such as running into danger instead of away from it.

The best example of panic I have ever seen was in an Australian soldier who had come straight to London from Gallipoli. He had never suffered from shell-shock, but had emerged from the Piccadilly tube into one of the thickest of London fogs; when I met him he was the most complete picture of panic I have ever seen. He was quietened by a drink and some explanation of the unnatural darkness.

APATHY

There is another reaction of the civil population to war that may be very terrible—not anxiety, not panic, but the negation of anxiety and the negation of panic, perhaps the exhaustion of the faculty to feel anxiety. This is apathy, the stunned apathy which one has read of in populations, particularly when there has been malnutrition, where the stress of bombardment, carnage, and destruction have been very great. This is not a type of panic, but something worse, a deadening of all emotional response, of grief, fear, or joy. I hope we may never see it, because descriptions of its occurrence in large sections of a community are very terrible.

MAINTENANCE OF MORALE

What can be done to help the population to keep their morale under stress of war? What, at any rate, are the ideals to be aimed at? Evidence, clear evidence, must be given to the mass of the civil population that there is preparedness, that there is organisation; and every man and woman, especially in urban areas, must have a job to do and know where and how to do it. There must be evidence of leadership, not for efficiency only but—if I may stress the main point I am trying to make—as a defence against anxiety. At the beginning of this lecture I spoke of the evidence of mass suggestibility and tried to show the relation between increased suggestibility and the absence of knowledge of facts, and, therefore, of the critical faculty. For this reason I believe it to be essential that the government of this country should, as far as possible, and as early as possible, let facts be known. This, to my mind, is the best and perhaps the only defence against morbid suggestibility in the masses, against scaremongering and deliberate misstatement either by the press or by orators, both at street corners or in high places. The acceptance of a suggestion is the assimilation of a statement without criticism: without criticism because the persons making this statement are held to be an authority, who is to be trusted implicitly. It is, therefore, essential for the civil population, not so much that leaders should be trusted, as they will be, but that these leaders should be worthy of trust.

I have said very little about mass panic and mass hysteria because I think the difference is quantitive and not qualititive. In both these conditions, almost the only difference is that a number of people react in the same way to the same stimulus. I do not think there is any evidence that there is a special form of panic or hysteria which occurs only in a group or a crowd. On the other hand, we must bear in mind that when there is common danger people tend to get together into groups, whose reaction will depend very often on the presence of some one person in the group, who, for good or evil, rightly or wrongly, is accepted as having authority.

After the Napoleonic wars the people of England were at a very low ebb, through want, unemployment, and hardship of all kinds. In order to try to lull some of the discontented the government ordered the building of more churches, believing or hoping, I suppose, that if the people were encouraged to have faith in a future happiness they might be more tolerant of their present sufferings. I am not urging this as a government measure in time of war. I do, however, seriously wonder whether if we have to experience the horrors of a war on the civil population, the return of some religious belief may not prove to be for many people one of the best defences against anxiety. It has happened before in the history of the world, and may happen again. May I quote from an article by Henry Bergson on the meaning of war, written during the last war. "The moral energy of nations, as of individuals, is only sustained by an ideal higher than themselves and stronger than themselves to which they may cling firmly when they feel their courage wane." He goes on to speak of Germany then—as I think he might write now of the totalitarian states—"Her energy comes from her pride. Her moral force is only the confidence which her material force inspires in her, and this means that in this respect she is living on reserves without means of replenishment."

THE BASIC PROBLEM

Throughout this paper I must seem to have been whipping the same horse—anxiety and the defences against anxiety. I have done this because, in my opinion, this is the main, even perhaps the only, basic problem when we try to think of the effect of war on the civilian population.

During war there is objective cause for fear, there is the risk of loss of life, of property, and of the lives of others; but, as war goes on, real anxiety becomes transformed into neurotic anxiety, anxiety which persists in both mental and bodily disturbance long after the objective cause for anxiety has been removed, temporarily or permanently.

I believe most firmly that the effect of air-bombardment will depend not so much on the intensity as on the frequency of the raids. It is continued and not intermittent stress which does the most severe damage to both mind and body.

Perhaps the supreme test of stability of mind and body is the speed with which complete recovery takes place after the objective cause for anxiety has been removed. There was plenty of evidence of this during the last war. Battalions remained more stable if they could be given frequent, but not too long, periods of rest from the front lines.

Of course, everyone in the civilian population is not equally anxious. There are, undoubtedly, some types which are much more tolerant of stress, are more phlegmatic, and less imaginative. I am not speaking here of bravery or cowardice, which does not depend on whether anxiety is or is not experienced. In my opinion, based upon four years' work with shell-shock patients, not one of us, however phlegmatic, is immune from anxiety. It is just a question of dose. If stress is sufficiently prolonged the most phlegmatic may break down, and when they do the condition is often more severe and lasting than when some tolerance of anxiety has been previously acquired.

If the immediate effects of anxiety are severe, the remote effects on the civilian population will be equally severe. We are only beginning to realise the effect of neurotic anxiety on every function of the body; the effect of real anxiety will be just as serious. As the result of endocrine and sympathetic disturbances, no system is immune—cardiovascular, digestive, or respiratory.

Although I am not able to give you, at the moment, really satisfactory proof, excluding incurable shell-shock cases and the psychoses where the connexion is obvious, I believe that many of the cases we have all seen and known of apparently healthy men cut off in their early forties by cardiac or coronary disease, were due, and directly due, to the stress of the war years. All of us could give many other instances of possible late effects on other functions, instances not perhaps capable of proof, but to my mind as certainly due to the remote effects of the war years as that the sun gets up.

ANGER

When the destruction of life and property is particularly cruel, insensate, and spares no one, there is one other reaction of the civilian population—blind, unreasoning anger. Even in normal life, anger releases for the time being the tension of normal anxiety. Under war conditions it may be directed against the authority of the government, or more probably against all or any who may, however unjustly, be suspected of sympathies or any racial affinity with the enemy. Bearing in mind the release of the taboo on cruelty and sadism of which I spoke earlier on, this anger may prove a very terrible thing in any population, especially when it is not the result of personal anxiety but of ocular evidence of carnage and destruction. I am afraid it leads to the blind demand of "an eye for an eye and a tooth for a tooth."

WOMEN AND CHILDREN

Two other points. Will women stand war conditions as well as men? My own opinion and my own experience is that they will stand the stress of danger as well, if not better, than men but that we must give them an outlet for their maternal protective instinct. To many women their menfolk are their children, and they will stand the stress better if they are not separated from them. Evacuation may be, probably must be, necessary, but I should not like to have the handling of a big camp of women whose menfolk, fifty miles away, were under daily bombardment.

Secondly, what is the effect of war anxiety on children? Curiously enough, there is good evidence that they are more upset, at least at first, by the separation from, or by the emotional disturbance of, their parents and family, than they are by the actual war situations. Children taken into hospitals are as a rule more perturbed about the absence of the mother they know, than by the operative procedures of which they know very little. As in hospitals, much may be done, by sympathetic interest, to quell their immediate fears. It is still more important that children, if evacuated, should remain in groups familiar to them—such as school classes—and under familiar authority. In such circumstances experience shows that children may show few signs of anxiety.

* * *

This is a grim subject; and it gets grimmer the more you think about it. But much is speculative and, frankly, I do not think we can know, perhaps mercifully, what the effect would be of a war directed primarily against the civilian population. I sincerely believe that if rulers of any country who consider war a legitimate means of satisfying their desires could realise to the full what are the immediate and remote results of anxiety and fear on a civilian population, they would hold their hands. However great the maiming and loss of life, in the end it will be less disastrous than the result of anxiety, if this is severe and prolonged. Not only will there be countless damaged lives, individuals cut off from full happiness and enjoyment, but there will be a heritage which can, I believe, affect generations to come.

HORMONAL RELATIONSHIP BETWEEN THE OVARY AND THE ADRENAL GLAND

AND ITS SIGNIFICANCE IN THE ÆTIOLOGY OF MAMMARY CANCER

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In previous publications we have recorded the fact that œstrogenic hormones affect not only the sex organs but also almost the entire endocrine system (Cramer and Horning 1936a and b). Some endocrine organs show a hypertrophy—e.g., the islets of Langerhans and particularly the anterior lobe of the pituitary, where there is also an intense hyperæmia leading sometimes to hæmorrhages and a massive accumulation of colloid. The opposite effect is seen in the thyroid, which is small and in a resting condition, and particularly in the adrenal, in which a definite process of degeneration sets in, called by us the "brown degeneration" (Cramer and Horning 1937). All these changes appear before the onset of cancer in the mamma.

The brown degeneration of the adrenals is of special significance in connexion with the problem of carcinogenesis in the mamma. This derives from the fact that this degeneration can be induced by œstrinisation in ordinary mice of mixed strains in which cancer of the mamma develops in a small number of the treated animals, while in mice of the inbred R. III strain, with a high incidence of

*The work was begun during a tenure of a Beit memorial fellowship for medical research.

mammary cancer in the females, the same degenerative change sets in spontaneously even if no excessive œstrin is supplied and before the appearance of malignancy in the mamma. The spontaneous occurrence of the brown degeneration in the R. III strain has been confirmed by Dobrovolskaia-Zawadskaia and Zephiroff (1938), who also recorded the absence of this phenomenon in other genetically pure strains free from spontaneous mammary cancer. In these latter strains the brown degeneration failed to appear, even when the mice developed malignant tumours in organs other than the mamma in response to such carcinogenic agents as radon and dibenzanthracene. We have recently examined the adrenals of 5 female and 4 male mice aged ten months or more, belonging to another genetically pure strain with a high incidence of mammary cancer, and found the brown degeneration present in every animal.

These facts indicate that in these two strains with a high incidence of mammary cancer there is a disturbance in the functional relationship between the ovary and the adrenal and suggest that this abnormality is a visible manifestation of the vague term "susceptibility to mammary cancer." It is possible, therefore, that this disturbance is an ætiological factor in the development of cancer in the mamma. To investigate this problem we have studied the reaction of adrenalectomised animals to the œstrogenic hormone of the ovary in mice of mixed strains and in mice of the inbred strain R. III with a high incidence of mammary cancer.

Experiments

Adrenalectomy was performed in two stages with an interval varying from ten to fourteen days. Either ether or, less frequently, Avertin were used as an anæsthetic. The glands were removed by the dorsal route. The operative mortality was low—i.e., death soon after the operation with obvious signs of failure in the operative technique, such as hæmorrhage in the abdomen, septic infections, and pneumonia. Such animals were excluded from the protocols. In all the animals which died or were killed a search was made at the upper pole of the kidneys for the presence of adrenal tissue. This is difficult when advanced post-mortem changes have set in. In a small number of animals cortical tissue was found in the form of a tiny round nodule enclosed in a capsule. These were, therefore, accessory cortical adenomas which may have been formed by hypertrophy from adrenal cortical rests after the glands themselves had been removed. These animals reacted to œstrinisation in the same way as normal mice with their adrenals intact. They were accordingly recorded in a separate group as containing demonstrable accessory cortical tissue. This must not be taken to mean that such tissue may not have been present elsewhere in the body when none was found at the upper pole of the kidneys. It only means that we did not demonstrate its existence. Œstrinisation was carried out by painting twice weekly the dorsal skin with a 0·01 per cent. solution in chloroform of a crystalline preparation of œstrin (Dihydroprogynon) for the generous supply of which we are indebted to Dr. Neumann of Scherings Ltd.

EFFECTS OF ŒSTRIN IN ADRENALECTOMISED MICE

When œstrinisation and adrenalectomy were carried out simultaneously there was among the male mice a great increase in the already high mortality produced by adrenalectomy alone. The reason for this curious phenomenon, which threatened to make further progress along this line difficult, is still under investigation. The difficulty could be got over when it was found that a course of œstrinisation preliminary to adrenalectomy greatly diminished the mortality. We therefore carried out two series of experiments with mice of mixed strains:—

(1) Adrenalectomy in male and female mice. This series served as the control.

(2) Adrenalectomy in male and female mice which had been subjected for periods varying from three to six months to œstrinisation; this was continued after the operation.

For purposes of comparison the adrenalectomised mice were grouped according to their survival in three groups:—

(1) Mice which died within the first fifteen days after the removal of the second adrenal;

(2) Mice which died between the fifteenth and thirtieth days after the second adrenalectomy; and

(3) Mice which survived the first month.

Most of the mice of the third group lived for several months, sometimes for ten months, and some of these were killed at various periods for the histological examination of the mamma and the endocrine organs. A few died from intercurrent diseases.

TABLE I

—	Adrenalectomy alone			Adrenalectomy after œstrinisation		
	M.	F.	Both sexes	M.	F.	Both sexes
Died 1–14th day ..	2	3	5	2	1	3
„ 15–30th „ ..	2	4	6	2	1	3
Survived	4	9	13	15	11	26
Total	8	16	24	19	13	32
Survival (per cent.) ..	50	56	—	79	85	—

The results of this experiment are given in table I and show a marked difference between the two groups. In the non-œstrinised control mice 50 per cent. of the males and 56 per cent. of the females survived the first month, whereas in the œstrinised mice the survivals amounted to 79 per cent. in the males and 85 per cent. in the females. There is a difference between the two sexes in so far as the females showed a better survival than the males in both groups. Accessory cortical tissue visible to the naked eye at the upper pole of the kidney was found in 2 males of the control group, but not in the œstrinised group. Both these mice survived; they are not included in table I.

These results lead to the conclusion that in the œstrinised organism the endocrine balance has been altered in such a way as to make those endocrine functions of the adrenals which are essential to life supererogatory; in other words, an excessive supply of the œstrogenic ovarian hormone protects against the loss of the adrenal hormone essential to life.

There is evidence that the converse also holds good—namely, that in the absence of the adrenals the effects of an excessive supply of the œstrogenic hormone are diminished. This manifests itself already in the living animals. The loss of weight, arrest of growth, and emaciation produced in the intact animals by prolonged œstrinisation are not nearly so obvious in the adrenalectomised animals and may even be absent. An examination of the organs chiefly affected by prolonged œstrinisation in an intact animal—namely, the testis and the thymus, which undergo atrophy, and the pituitary

and the mamma which show a marked hypertrophy—reveals further striking differences. These organs were less affected—and sometimes much less so—in adrenalectomised animals than in intact animals.

The different reaction to œstrinisation between intact and adrenalectomised animals is seen very clearly in the testis, which in intact œstrinised mice undergoes atrophy fairly rapidly and regularly. After prolonged œstrinisation this atrophy is so marked that it is sometimes necessary to search carefully for the organ. Its weight, which in a normal mouse amounts to 70–80 mg., falls after six months' œstrinisation to 15 mg. and even to 6 mg. Histologically there is complete cessation of spermatogenesis. In adrenalectomised mice the diminution in size after œstrinisation is not nearly so obvious and does not exceed as a rule half its normal weight. Spermatogenesis is not arrested. There is a striking similarity between the protection of the testis against the atrophy induced by œstrinisation which results from the absence of the hormonal functions of the adrenal gland, and the protection resulting from the continued injection of its physiological antagonist, the thyrotropic hormone of the anterior-pituitary lobe (Cramer and Horning 1938). This resistance of the testis of adrenalectomised mice to the effects of œstrinisation is illustrated in figs. 1, 7, and 8.

The thymus, which in œstrinised intact animals is small or atrophied, persists in œstrinised adrenalectomised animals. In many animals it was enlarged, and in one mouse there was even a thymus tumour. In this connexion we wish to record that during the past year we have found neoplasms of the thymus in 3 other non-adrenalectomised mice in which a disturbance of the hormonal balance had been induced by prolonged treatment with different hormone preparations. The lymph-glands in the groin, embedded in mammary tissue, which were taken as a test object, are also often greatly enlarged. In a few cases we have seen enlargement also in the retroperitoneal glands, and in one mouse there was a massive enlargement of all the lymph-glands. Since such a condition of lymphomatosis occurs sometimes spontaneously in our laboratory stock of mice, no significance can be attached to it at present.

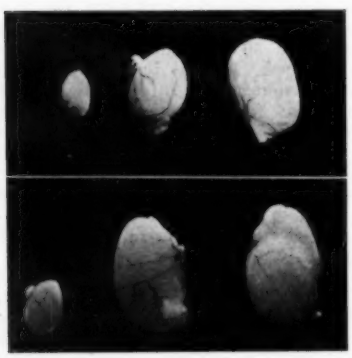

FIG. 1—Comparative sizes of testes in two groups of three mice each illustrating the protection against the atrophic effect of œstrinisation produced by (*a*) adrenalectomy (upper row); (*b*) injection of anterior-pituitary lobe hormone (thyrotropic hormone). In each row the large testis on the right side is that of a normal mouse, the atrophied testis on the left side that of an œstrinised mouse, the testis in the middle that of a mouse œstrinised for the same length of time and adrenalectomised (upper row) or thyrotropinised (lower row).

The difference between intact mice and adrenalectomised mice in the reaction of the thymus and the testis to œstrinisation

FIG. 2—Mamma of female mouse No. 1289, œstrinised for 7 months.

was very evident in this experimental series, even although the animals had been subjected, before adrenalectomy, to a course of œstrinisation lasting from three to six months, during which a considerable degree of atrophy of these organs must have taken place. It seems possible that in the later course of œstrinisation after adrenalectomy these organs may actually have undergone some restitution, but this point will have to be examined by further experiments.

A comparison between the effects on the pituitary and those on the mamma is more difficult in this experimental series for a variety of reasons. Firstly, these organs had already undergone a considerable degree of hyperplasia during the preliminary course of œstrinisation, when the adrenals were present. Secondly, in individual mice of mixed strains these organs show considerable variations in the degree of their reaction to œstrinisation; and thirdly, the degree of differences in these organs is more difficult to assess, for it depends on a comparison of a number of different histological features for each gland. But none of the adrenalectomised œstrinised mice showed in the anterior lobe of the pituitary the advanced degree of enlargement, hyperæmia, and loss of acidophil cells which are found in a number of the intact œstrinised animals. Similarly, the mammary gland of the adrenalectomised œstrinised animals never showed such an advanced degree of development and of secretory activity as is seen in many œstrinised intact animals.

TABLE II

No. of mouse	Weight (g.)	Thymus	Mamma	No. of mouse	Weight (g.)	Thymus	Mamma
ADRENALECTOMISED MICE				INTACT MICE			
1286	27	+++	+	1287	22	+	++
1288	26	+++	++	1289	19	+	+++
1265	30	+++	±	1291	18	+	Carcinoma

Much more striking differences are obtained if the preliminary course of œstrinisation is omitted—i.e., if the adrenals are removed at the beginning of œstrinisation. For reasons given above, such experiments are best carried out with female mice. The results of such an experiment with two groups of 3 mice each are summarised in table II. The period of œstrinisation lasted for seven months. The comparative size of the thymus is given approximately

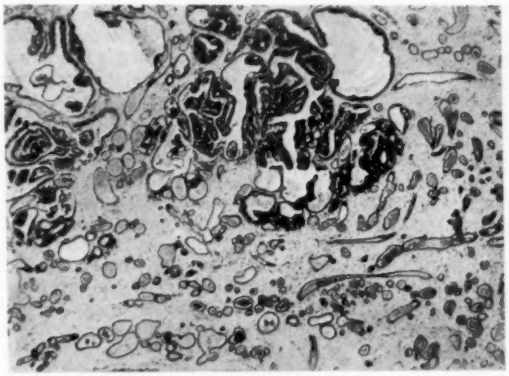

FIG. 4—Mamma of male mouse No. 1262 of strain R. III, adrenalectomised and œstrinised for 5 months. Accessory cortical tissue was present in this mouse. The mamma shows an early carcinoma. A palpable carcinoma was present in another mamma.

by the number of plus signs. The relative development and secretory activity of the mamma is similarly indicated, the sign ± signifying that the gland is undergoing involution.

The microscopical appearances of the mamma of one mouse of each group (Nos. 1288 and 1289) are shown in figs. 2 and 3. In the intact œstrinised mice (No. 1289) the ducts and acini are filled with secretion, the cells are large, cubical, and rich in cytoplasm (fig. 2). In the adrenalectomised mice œstrinised for the same length of time (No. 1288) the mamma is poorly developed, the cells are small and poor in cytoplasm, and there is no evidence of secretory activity (fig. 3). The development of a palpable carcinoma in the mamma of an intact mouse (No. 1291) shows that the mammæ must have been very fully developed. This was confirmed by examination of another mamma of this animal. Since in mice of mixed strains the development of cancer of the mamma in response to œstrinisation occurs irregularly, and the number of mice used in this experiment is small, no conclusions can be drawn from this experiment alone concerning the effect of adrenalectomy on carcinogenesis in the mamma. This question, which was examined experimentally in another series with mice of the R. III strain, will be discussed subsequently in this paper.

EFFECTS OF ADRENALECTOMY ALONE

An explanation of the results presented so far was obtained by a study of the effects of adrenalectomy alone. It was found, rather unexpectedly, that adrenalectomy itself—i.e., without œstrinisation—also produces definite changes in the mamma and in the thymus. If the mice survive sufficiently long, the thymus persists and is almost always enlarged, and the lymph-glands, as judged by the glands in the groin and the retroperitoneal glands, are also frequently enlarged. In one animal all the lymphoid tissue was greatly enlarged, presenting the condition of lymphomatosis observed in an œstrinised and adrenalectomised mouse and referred to above. These findings demonstrate the existence of an endocrine control of the thymus and perhaps also of the lymphoid tissue. They also indicate the possibility of endocrine factors in the ætiology of neoplasms of the thymus, in view of the occurrence of thymus tumours in four mice in which a disturbance of the endocrine balance had been brought about by various means. The investigation of this new problem is now under way. The mammary gland tissue is devoid of secretory activity and in some animals appears to be in process of involution. There are also changes in the pituitary which, like the changes in the testis, the mamma, and the thymus, are in the direction opposite to those produced by the œstrogenic hormone of the ovary and similar to those following injections of the thyrotropic hormone.

Since the effects of the œstrogenic ovarian hormone and those of adrenalectomy oppose each other, the important conclusion follows that one—or more—of the hormonal functions of the adrenal gland acts synergically with that of the œstrogenic ovarian hormone. As a result the effects of the ovarian œstrogenic hormone are greatly diminished and may be arrested when the adrenal glands are absent.

EXPERIMENTS ON INBRED HIGH-CANCER STRAIN

To investigate how adrenalectomy affects the experimental development of mammary cancer by the ovarian œstrogenic hormone, it was necessary, for reasons given above, to carry out observations on male mice of the high-cancer strain R. III. They react in all respects more rapidly and more uniformly to œstrinisation. As regards carcinogenesis, almost all the males begin to develop mammary cancer after seven months, and before the sixth month has elapsed cancer has appeared in most of them. It is rare to find a male mouse of this

FIG. 3—Mamma of female mouse No. 1288, adrenalectomised and œstrinised for 7 months.

FIG. 5—Mamma of male mouse No. 1310 of strain R. III, adrenalectomised and œstrinised for 7½ months.

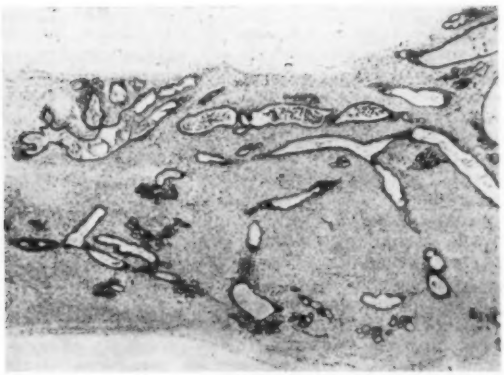

FIG. 6—Mamma of intact male mouse No. 1290 of strain R. III, œstrinised for 7½ months.

strain which remains free from mammary cancer after eight months' œstrinisation. It is, therefore, not possible, when working with this strain, to subject the animals to a prolonged course of œstrinisation preliminary to adrenalectomy, as was done in the first series, if one uses this strain to study the effect of adrenalectomy on carcinogenesis in the mamma. For this reason the preliminary period of œstrinisation had to be shortened to a few weeks. This reduces the number of animals surviving adrenalectomy. We have succeeded in keeping alive 8 male

TABLE III—MALES OF R. III STRAIN

No. of mouse	Total period of œstrinisation (months)	Adrenalectomy after (weeks)	Carcinogenesis in mamma	Testis: degree of atrophy	Pituitary changes	Accessory cortical tissue demonstrated
1262	4	6	+	+++	++	+
1230	3½	6	+	+++	++	+
1209	5	3	+	+++	++++	+
1303	6½	6	−	+	+	−
1310	7	6	−	+	+	−
1121	10	15	−	+	+	−
1293	6	6	+	+++	++++	−
1302	8	3	+	++	++	−

mice of the R. III strain, in which adrenalectomy was performed after a short preliminary period of œstrinisation. In 3 mice of this group accessory cortical tissue was found at autopsy at the upper pole of the kidney. In table III in which the effects of œstrinisation are summarised, the mice with and without demonstrable accessory cortical tissue are grouped separately.

The results show that in the group with demonstrable accessory cortical tissue all 3 mice developed mammary cancer, and did so after as short a period of œstrinisation as is necessary for intact mice. In these 3 mice the testes were as atrophic and spermatogenesis was as completely arrested (fig. 7) as in intact mice which have been œstrinised, and the pituitary changes, hyperæmia, and hypertrophy were also as conspicuous. In one mouse (No. 1209) there was a pituitary adenoma. In this inbred strain, as in the mixed strains, the animals with accessory cortical tissue reacted to œstrinisation in the same manner and as readily as intact mice of the strain. They may therefore be used as a comparison for the remaining 5 mice. Fig. 4 is a low-power photomicrograph of a mamma from a mouse belonging to this group (No. 1262 in table III). A palpable carcinoma had developed in one mamma of this animal. The figure illustrates the condition of another mamma, in which a very early stage of carcinogenesis was found on microscopical examination.

In the other group of 5 mice without demonstrable accessory adrenals, two developed mammary tumours after a longer interval than was observed in the first group; the other 3 mice had remained free from mammary cancer for six months or more, and microscopical examination showed a very poor development of the mamma. This is illustrated in fig. 5, which shows the mamma of mouse No. 1310 in table III. For comparison, fig. 6 is given as illustrating the condition of the mamma from an intact œstrinised male of the R. III strain which did not respond readily to the carcinogenic effect of œstrinisation. This mouse (No. 1290) had been œstrinised for seven and a half months without developing a carcinoma. After such a treatment the mamma of most males of this strain would have undergone the malignant change and presented an appearance more like that shown in fig. 4. But even in the relatively resistant mamma of mouse No. 1290 there is an abundant development of mammary tissue with full secretory activity, and this development is in part atypical, indicating a precancerous condition. There is, therefore, a striking difference between the reaction to œstrinisation of the mamma in an intact animal of this strain when the mamma is naturally resistant to carcinogenesis, and of a mamma in an animal rendered resistant by adrenalectomy. In the former the mamma is fully developed; in the latter this development is absent. The changes in the testis and pituitary were as marked in the 2 mice with mammary tumours (Nos. 1293 and 1302) as in the 3 mice in which accessory cortical tissue had been found (table III and fig. 7). They were slight in the other 3 mice without mammary tumours. This is illustrated by the condition of the testis of mouse 1303 (fig. 8). The results show that adrenalectomy makes male mice of the R. III strain more resistant to the carcinogenic effects of œstrinisation but does not confer an absolute

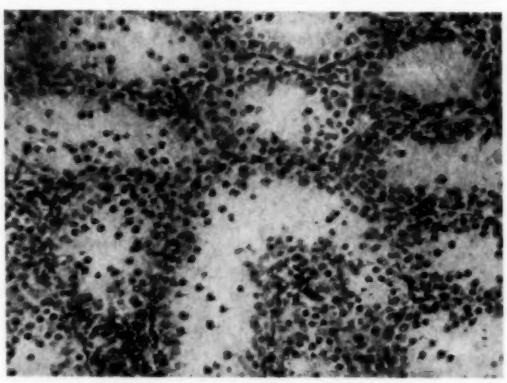

FIG. 7—Testis of mouse No. 1262 of strain R. III, adrenalectomised and œstrinised for 5 months. Accessory cortical tissue was present. The testis shows the atrophy and cessation of spermatogenesis also found in intact mice after œstrinisation. See fig. 4 for condition of mamma.

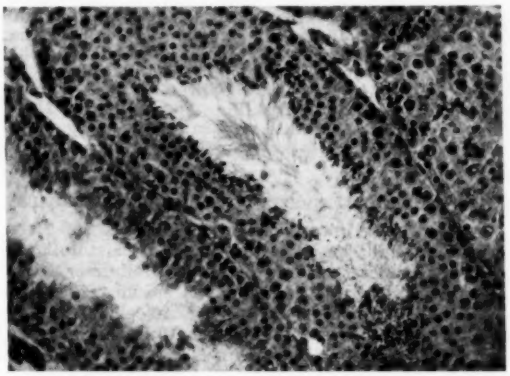

FIG. 8—Testis of mouse No. 1303 of strain R. III, adrenalectomised and œstrinised for 6½ months. The testis was almost normal in size, and there is active spermatogenesis.

protection against it. In the presence of accessory cortical tissue adrenalectomy fails to protect the organism against the effects of œstrinisation.

There was a close parallelism between the effects of œstrinisation on the mamma on the one hand and on the endocrine system on the other: resistance to mammary cancer was accompanied by resistance to changes in the endocrine system.

Summary and Conclusions

This investigation has given three clear-cut results—

(1) Adrenalectomy is followed by changes in the thymus, the pituitary, and in the mamma, which are the reverse of those produced by œstrinisation.

(2) Œstrinisation makes mice resistant to adrenalectomy, as judged by their survival.

(3) Adrenalectomy makes mice resistant to the physiological effects of the œstrogenic hormone of the ovary. In the absence of accessory cortical tissue, it diminishes or prevents the arrest of growth and loss of weight, the atrophy of the thymus and of the testis, the changes in the anterior lobe of the pituitary, and the hyperplasia and secretory activity of the mamma. In producing this resistance to œstrinisation the absence of the hormonal functions of the adrenal gland has the same effect as that produced by us previously by a continued supply of the physiological antagonist to the ovarian œstrogenic hormone, the so-called thyrotropic hormone of the anterior-pituitary lobe.

These three results are consistent with each other. They lead to the conclusion that the adrenal gland possesses hormonal functions which are synergic with the œstrogenic functions of the ovary. This conception is in accordance with the close embryological relationship between the adrenal cortex and the ovary, and with the recent findings that œstrogenic hormones are present in the adrenal cortex. This synergism does not imply that these hormonal activities of the ovary and the adrenal merely summate each other. There are the alternative possibilities that the œstrogenic ovarian hormone requires for its activity a preliminary transformation in the adrenal gland, or that it needs the simultaneous presence of the synergic adrenal hormone.

The pathological effect produced by the prolonged application of the ovarian œstrogenic hormone—carcinogenesis in the mamma—can also be weakened in the absence of the hormonal activity of the adrenal glands. It follows therefore that the adrenal gland possesses hormonal functions which play a part in the ætiology of mammary cancer. This may account for the fact that ovariectomy in female mice belonging to a strain with a high incidence of mammary cancer delays but does not prevent the development of mammary cancer (Lathrop and Loeb 1916 and Loeb 1919), unless it has been carried out soon after birth (Cori 1927). Whether this part is merely a contributory one or whether it is as important as that of the ovary is a problem demanding further investigation.

The effect of adrenalectomy on the thymus and the lymph-glands demonstrates the existence of an endocrine control of these tissues. The occurrence of neoplasms of the thymus in 4 mice in which a disturbance of the hormonal balance had been brought about by various means suggests the existence of endocrine factors in the ætiology of thymus tumours.

In 9 mice of another inbred strain with a high incidence of mammary cancer the brown degeneration of the adrenals was regularly observed.

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COMBINED SERUM AND SULPHANILAMIDE

IN THE TREATMENT OF STREPTOCOCCAL INFECTIONS IN MICE

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ALTHOUGH drugs of the sulphanilamide class have given striking results in the treatment of various bacterial infections, there is still room for improvement. In some cases of acute hæmolytic streptococcal infection with a persistent bacteræmia these drugs seem powerless to control the infection; in others control can be obtained only by giving dangerously large doses.

It is not clear what factors are responsible for these failures of the new chemotherapy. It may be that sometimes the infecting streptococcus is drug-resistant; there seems to be an impression also that streptococcal septicæmia following cellulitis is less amenable to treatment with sulphanilamide than puerperal septicæmia. It appears more probable, however, that the explanation of the majority of failures is to be sought in the depression of activity of the host's phagocytic cells and the failure in immune response. Although the mode of action of sulphanilamide and similar preparations is imperfectly understood, it is clear from the work so far published (Colebrook, Buttle, and O'Meara 1936, Bliss and Long 1937, Gay and Clark 1937) that they are not directly bactericidal but merely bacteriostatic; they require the coöperation of phagocytes in order to bring about the destruction of the bacteria. Apparently the drug interferes with the metabolism of the bacterium and so prevents the development of

those attributes on which virulence depends. Lyons and Mangiaracine (1938) for instance have shown that virulent β-hæmolytic streptococci grown in media containing sulphanilamide become spontaneously agglutinable and readily phagocyted and killed in vitro by human blood containing no specific antibody; these findings suggest either some alteration in, or imperfect development of, the surface or capsular antigen. Specific bacterial antibodies, on the other hand, render the bacteria innocuous by uniting with and altering those antigens responsible for virulence—the capsular antigens in the case of the hæmolytic streptococcus and the pneumococcus. They achieve the same effect as the drug but in a different manner. The two therapeutic agents, drug and antiserum, are therefore complementary in their action and the efficacy of the two together should be much greater than either alone.

Already there is some evidence that this is so. Fleming (1938) has demonstrated by in-vitro tests on pneumococci that the addition of immune serum enhances the action of M. & B. 693. Experiments with staphylococcal infections in mice carried out by De and Basu (1938) pointed to the beneficial effect of a combination of drug and antiserum. In the treatment of gonorrhœa with sulphanilamide Cokkinis and McElligott (1938) produced evidence which suggested that this form of chemotherapy is most effective when the patient has had time to acquire some degree of active immunity to the infection. And quite recently, since the work reported below was completed, Lyons and Mangiaracine (1938) have shown the necessity of bacterial antibody in addition to sulphanilamide in the treatment of certain persistent bacteræmias due to the hæmolytic streptococcus.

Sulphanilamide and similar compounds are toxic and although grave toxic symptoms arise but rarely from their use in the treatment of human disease, any means whereby the dosage could be reduced would be welcome. The possibility of achieving this by combining immunotherapy with the administration of the drug led me to undertake some experiments on mice; the results obtained form the subject of this communication.

Before describing the experiments it should be pointed out that although an antiserum will protect mice against a group A hæmolytic streptococcus when it is given prophylactically—i.e., the day, or at least some hours, before infection (Dochez, Avery, and Lancefield 1919, Loewenthal 1932, 1934, 1938, Lancefield 1934)—there is no evidence that it has any beneficial effect on an established infection. And with regard to the efficacy of sulphanilamide in experiments of this type it is clear from the available evidence (Buttle, Gray, and Stephenson 1936) that single doses of the drug administered immediately after infection, while postponing the death of the mice, succeed in saving only a small percentage of the animals.

TECHNIQUE OF EXPERIMENTS

Administration of the drug.—The sulphanilamide (Sulphonamide-P Burroughs Wellcome) was ground to a fine powder and suspended in a 3 per cent. solution of tragacanth immediately before use. The suspension was vigorously shaken and the appropriate amount given to mice by mouth with a syringe fitted with a long blunted needle.

The *antistreptococcal serum* was prepared in the rabbit according to a method, recently described (Loewenthal 1938), which depends on the use as antigen of young encapsulated cocci killed by heating for twelve minutes at 56° C. Such sera protect mice against as many as 100,000 M.L.D.

Strain of streptococcus.—The strain of *Streptococcus pyogenes* (L. 193) used in these experiments was isolated originally from a case of puerperal septicæmia. It belongs to Lancefield's group A and Griffith's type 13. Its mucoid phase is of high virulence for mice, 0·5–1 c.cm. of a 10^{-9} dilution of a serum-neopeptone-water culture killing mice in two to three days. The infecting dose used in the majority of the experiments was shown by plate counts to contain 100–200 cocci.

SULPHANILAMIDE AND SERUM USED PROPHYLACTICALLY

In these experiments the immune serum was given sixteen to eighteen hours before, and the sulphanilamide immediately after infection. Preliminary tests had shown that 0·1 c.cm. of the serum, given the day before infection, protected mice completely against the test dose (1 c.cm. of a 10^{-7} dilution of an overnight culture) of the strain L.193. Smaller doses of serum (0·05–0·03 c.cm.) enabled the mice to live longer than the controls. A dose of 0·02 c.cm. of the antiserum was therefore chosen. The amount of the drug was varied from 6 to 25 mg. The result of one experiment, representative of five, is given in table I.

TABLE I—PROPHYLACTIC EFFECT OF SULPHANILAMIDE ALONE AND WITH IMMUNE SERUM

Sulphanilamide (mg.)	Serum (0·02 c.cm.)	
	Immune	Normal
—	D2 .. D2 .. D2 .. D2	D2 .. D2 .. D2 .. D2
6	D3 .. S .. S .. S	D2 .. D2 .. D3 .. S
12	D4 .. D8 .. S .. S	D6 .. D8 .. D8 .. S
25	S .. S .. S .. S	D6 .. D6 .. D7 .. S

S = Survived. D = Died. Numerals indicate day of death after infection.

All the mice receiving either immune or normal serum alone died in two days and the majority of the animals given sulphanilamide and normal serum also succumbed, whereas those receiving sulphanilamide and immune serum mostly survived. Although it may be open to doubt whether the differences between the groups of mice receiving 6 or 12 mg. of sulphanilamide and immune serum and those which got the same amount of drug and normal serum is significant, there can be no doubt on this score in the case of the mice receiving 25 mg. of the drug; here the combination of drug and serum is obviously superior. Similar results were obtained in other experiments with 20 mg. of sulphanilamide and it can be concluded that single large doses of the drug alone, though postponing the time of death, are unable to prevent a fatal outcome of the infection, whereas in mice passively immunised they are regularly capable of doing so.

SULPHANILAMIDE AND SERUM USED THERAPEUTICALLY

In view of these results it was decided to test the synergic efficacy of sulphanilamide and antiserum given after infection. Mice were given the same infecting dose of the streptococcus L. 193 as in the previous experiments. Untreated in any way such animals show obvious signs of infection in eighteen hours; some die as early as twenty-four hours after infection, whilst the peak of the mortality is reached about the thirty-sixth hour. Treatment was commenced at the eighteenth hour after infection and consisted of the intraperitoneal injection of 0·02–0·05 c.cm. of antiserum and the administration by mouth of 15–25 mg. of sulphanilamide. Control groups of

TABLE II—RESULTS OF EIGHT EXPERIMENTS TESTING THE EFFICACY OF SULPHANILAMIDE AND SERUM GIVEN TOGETHER 17–18 HOURS AFTER INFECTION

Experiment	Number of surviving mice treated with—			
	Normal serum	Immune serum	Drug	Drug +immune serum
1	0/5	0/5	1/5	4/5
2	0/5	0/5	0/5	2/5
3	0/6	0/6	2/6	4/6
4	0/4	0/4	0/4	3/4
5	1/10	0/10	3/10	8/10
6	0/5	0/5	0/5	4/5
7	0/5	0/5	1/5	4/5
8	0/20	0/20	1/20	16/20
Total ..	1/60	0/60	8/60	45/60

The numerator of the fraction denotes the number of survivors, the denominator the number of mice in the group.

mice, similarly infected, received immune serum alone normal rabbit serum in the same dose alone, and the drug alone. The mice were kept under observation for two weeks. Altogether eight experiments have been carried out and although these experiments were not strictly comparable, since the dosage of serum and drug varied in the different tests, their results have been grouped together in table II, whilst the result of the last experiment (No. 8), in which 80 mice divided into four groups of 20 were used, is given in detail in table III.

It is clear from the data set out in these two tables that although immune serum alone is without effect on an established hæmolytic streptococcal infection in mice, and sulphanilamide by itself is only able to save a few of the animals, the two together save three-quarters of the mice. Since treatment was only commenced when the mice were seriously ill and some six hours before the first deaths would normally

TABLE III—COMBINED SERUM AND SULPHANILAMIDE TREATMENT OF MICE INFECTED 18 HOURS PREVIOUSLY

Mice receiving—		Death in days after treatment							Survivors alive after 14 days
Drug	Serum	1	2	3	4	5	6	7	
—	Normal rabbit 0·05 c.cm.	16	4	–	–	–	–	–	0
—	Immune rabbit 0·05 c.cm.	14	6	–	–	–	–	–	0
20 mg.	Normal rabbit 0·05 c.cm.	13	2	–	2	–	1	1	1
20 mg.	Immune rabbit 0·05 c.cm.	3	–	–	–	–	1	–	16

occur, this is striking proof of the synergic action of sulphanilamide and immune serum.

DISCUSSION

In view of the incompleteness of our knowledge of the mode of action of sulphanilamide, it would be rash at this juncture to attempt any explanation of the synergic action of the drug and the immune serum. As I have already stated, the evidence available suggests that these chemicals exert their curative effect by action on the bacterium or its products rather than by any stimulation of the defence mechanism of the host and the results of the experiments recorded in this paper seem to support this contention. The fact that in the preventive as well as in the therapeutic experiments the amount of drug could be only slightly reduced when antiserum was also given seems to indicate that the main responsibility of overcoming the invading micro-organism lies with the sulphanilamide and that the serum acts in a supplementary though no less important manner. It is probable that the main rôle of the serum is to attack the fully developed virulent streptococci and by uniting and neutralising those antigens on which invasiveness depends render the bacterium susceptible to phagocytosis. That this action of specific serum is different from, and a valuable addition to, the action of the drug is furnished by the experimental evidence recorded above; the two factors together achieve more than either alone can do. This point of view finds further support in the observations of Cokkinis and McElligott (1938) on the necessity for the development of some degree of active immunity in gonorrhœa if sulphanilamide is to effect a rapid cure, and the work of Lyons and Mangiaracine (1938) showing that the failure of this drug to control cases of overwhelming streptococcal septicæmia is to be attributed to the absence of protective antibody. Whether in human infections which are not of overwhelming severity the combined use of drug and serum will enable us to reduce the amount of drug it is impossible to say. But even though the mouse experiments do not hold out much hope of this being so, this point should be investigated directly in human infections; for, after all, the mouse experiments are more comparable to those human cases which from the outset are overwhelmed by the invading bacterium. And the fact that the immunity to the β-hæmolytic streptococci is type-specific does not render the task of making available protective sera insuperable. In the case of the pneumococcus the same difficulty has been faced and overcome and my recent work (Loewenthal 1938) seems to show that the same should be possible in the case of the streptococcus.

SUMMARY

A single dose of sulphanilamide administered at the time of infection with hæmolytic streptococci will protect only a minority of normal mice; whereas it protects the majority of animals which have received, 16–18 hours before infection, a dose of antiserum incapable by itself of preventing death.

Mice infected with hæmolytic streptococci can be effectively treated with a combination of sulphanilamide and antiserum even if this treatment is begun as long as 18 hours after infection, when the animals are already severely ill. Since neither sulphanilamide nor antiserum alone can achieve this result it appears that these two therapeutic agents act in a different but complementary manner.

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THE USE OF PLACENTAL BLOOD FOR TRANSFUSION

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It is only recently that human blood has been stored for considerable periods under refrigeration and a supply kept ready at hand in hospitals for emergency transfusions. This is a valuable advance on the previous system of having to send for a donor when an emergency arises, and a great deal of time and annoyance is saved if a supply of different groups is always available.

It appears from experience gained in the Spanish civil war that army medical services and civilian casualty hospitals must in future be prepared to arrange for the storage of blood on a large scale. In the Spanish civil war 200 c.cm. quantities of blood have been provided in sealed ampoules ready for emergency transfusions. The blood is obtained from voluntary donors and is sent up to the front line in a specially equipped lorry. The British Red Cross Society at the time of the recent national emergency had formulated a scheme for bleeding voluntary donors and preserving their blood as a daily routine. In America some hospitals have established "blood banks" in their basements where suitable refrigeration plants have been laid down.

The question then arises how blood in quantity can be provided. It is possible to obtain blood from three sources: firstly from an organised voluntary-donor service; secondly from the cadaver as is done in Russia; and thirdly from the placenta during the third stage of labour. The purpose of this paper is to draw attention to the feasibility of the last method and to detail the technique of the collection and storage of blood obtained from this source, together with the effects on mother, baby, and recipient.

At the City General Hospital, Leicester, we have a maternity department which deals with about 550 deliveries a year, and so there has been a very considerable source for placental blood. Where a patient is examined in one of our own antenatal clinics, a Wassermann reaction is performed as a routine so that unsuitable subjects are largely eliminated before labour commences.

METHODS AND CONTRA-INDICATIONS

Technique of collection.—When the baby is born it is laid on the mother's abdomen or in some other convenient place. The cord is clamped immediately with two artery-forceps, without waiting for pulsation to cease, and the infant is separated and handed to an assistant. The distal 6 in. of the cord is wiped clean with spirit and a fresh cut made with sterile scissors, the cord being controlled by the finger and thumb of the right hand, the left hand controlling the uterus.

The assistant holds the collecting receptacle and the operator directs the blood, which issues in a forcible jet, into the flask without allowing any part of the cord to touch it. During a uterine contraction the blood flows freely and in the intervals the cord is pinched by the finger and thumb to prevent spilling. It is better not to use a funnel, although this makes the collection of the blood much easier, because a clot may form in it and be washed into the flask. Full aseptic precautions are observed and a sterile towel with a central hole is all that is necessary to isolate the cord.

Anticoagulant and receptacle.—The most convenient form of receptacle is a conical flask of 300 c.cm. capacity which is marked with 100 and 200 c.cm. graduations. Into this is placed 80 c.cm. of physiological saline made from doubly distilled water and a cotton-wool bung is fitted so that the whole can be autoclaved. To the outside of the flask are strapped:

(1) A glass ampoule containing 1 gramme of recrystallised sodium citrate.

(2) Two small test-tubes, A containing 1 c.cm. of 3·8 per cent. sodium-citrate solution, and B for collecting a specimen of blood for the Wassermann reaction (fig. 1).

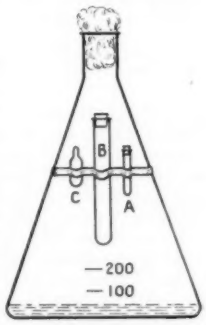

FIG. 1—Receptacle for blood. A=tube for grouping. B = tube for Wassermann. C= ampoule containing sodium citrate (1·0 g.).

Just before use the ampoule is broken and its contents added to the flask: the crystals dissolve quite readily at room temperature and heating is unnecessary.

When there is sufficient blood in the flask, a small amount is collected into the test-tubes A and B. A is for grouping purposes and B is for the Wassermann if this test has not been performed upon the mother recently.

The flask is labelled with the mother's name and the date and transferred to a refrigerator, at 33°–38° F. The necessary laboratory tests are performed as soon as possible and the blood is ready for use when the group is known. A list is kept of the amount of blood of each group in stock, any additions or subtractions being carefully noted. Each specimen is kept in its original flask until required.

Contra-indications to bleeding the placenta.—Blood is not taken when there is any transmissible disease, when labour is premature, when there is a multiple pregnancy, or when the membranes have been ruptured for more than 48 hours. If any accident of the third stage arises or if the infant requires resuscitative measures the collection of blood is abandoned in favour of the more important procedure.

DISCUSSION

Anticoagulant.—Goodall et al. (1938) use the preservative proposed by the Moscow Institute of Hæmatology which consists of:—

Sodium chloride	7·0	g.
Sodium citrate	5·0	g.
Potassium chloride	0·2	g.
Magnesium sulphate	0·004	g.
Twice-distilled water	1000·0	c.cm.

25 c.cm. of this fluid being added to 100 c.cm. of distilled water before use. This solution is now referred to in the Canadian and American press as "citro-seroid." Using this fluid however, we found that hæmolysis began after one week and became quite marked at the end of the second week. A

solution of sodium citrate only was then used—1 g. to 80 c.cm. of twice-distilled water—and substantial improvement in the keeping qualities of the blood was noted. Finally a citrate saline has been used with success. Hæmolysis is now negligible. Grodberg and Carey (1938) say that they took special care to prevent mixing the blood with saline or Ringer's solution, as clotting occasionally occurred when this was inadvertently done. In our experience this need not be feared. We have never been troubled by clotting when using citrate saline in the strength indicated.

Effects on the mother.—The mother might be affected in one way only—does the placenta separate as readily when it is empty as it does when engorged with blood? Goodall says that the third stage of labour is not prolonged. This is quite definitely our own observation.

Effects on the baby.—When we commenced storing placental blood we were met with the criticism that we were robbing the baby. Whilst it was obvious to us that we were merely taking blood from a diverticulum of the fœtal circulation it was thought advisable to do a series of blood-counts on a group of babies. Twelve babies whose placentæ had supplied blood and twelve controls were taken and blood-counts performed on the first, second, and seventh days after birth and immediately before discharge from hospital on about the fourteenth day. Fig. 2 shows that there is no appreciable difference in the blood-count of the two groups. The average counts of the two groups may be contrasted as follows:—

	PLACENTAL GROUP		CONTROL GROUP	
Day	R.B.C. × 10,000	Hb	R.B.C. × 10,000	Hb
1	675	15·2	651	15·3
2	650	15·0	641	15·0
7	641	14·8	606	14·6
13	606	14·5	601	14·3

R.B.C. = red blood-cells. Hb = Hæmoglobin in grammes per 100 c.cm.

Icterus has not been a feature of these two groups of children. It occurred in mild degree in three cases, one in the placental group and two in the control group.

Amount of blood obtained.—Goodall says that an average of 125 c.cm. of blood could be obtained from a placenta. This figure appears to us to be optimistic. In our last fifty cases we have obtained an average yield of 80 c.cm. This follows more closely the figures of Grodberg, who obtained an average yield of 107 c.cm. from male children and 103 c.cm. from female children. This amount of blood—which it must be remembered has a red-cell content of 6,750,000 per c.mm.—is mixed with 80 c.cm. of anticoagulant with the result that we have 160 c.cm. of transfusible fluid with a red-cell content of approximately 3,750,000 per c.mm. This compares quite favourably with the blood obtained from a donor, which is usually diluted so that 500 c.cm. of blood is made up to 600 c.cm., with the result that an original content of 5,000,000 red cells per c.mm. in the donor becomes 4,000,000 per c.mm. in the transfusible fluid.

Sterility.—Fifty specimens of blood after having been stored for varying periods showed no obvious contamination as evidenced by discoloration of the blood or froth on the surface.

For the purpose of this paper, fifteen consecutive specimens have been subjected to rigid bacteriological examination. Fourteen specimens were sterile and one specimen gave a mild growth of a *Staphylococcus albus* which did not produce a blue colour on Chapman's medium (Chapman and Berens 1935) and was considered non-pathogenic. At this point in the investigations the personnel of the blood-

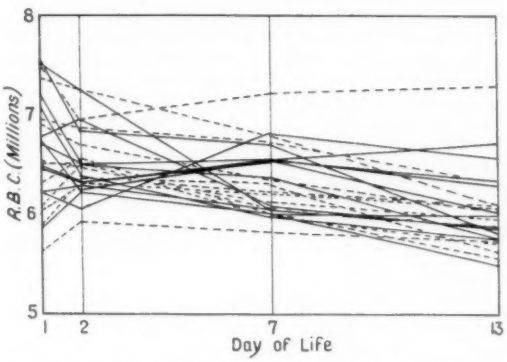

FIG. 2—Graph showing fall of blood-count in group of babies during the first two weeks of life. Continuous lines: bled-placenta group. Interrupted line: control group.

collecting team was changed and our technique was not strictly followed with the result that three out of five subsequent specimens were contaminated. It is obvious therefore that the sterility of the placental blood depends entirely upon the strict adherence to the technique laid down and upon the coöperation of the staff. Any slackness in the collecting team is immediately followed by contamination.

Effects on the recipient.—One or two points appear to us to be of prime importance. After standing in the refrigerator the blood-cells of course sediment. Before use it is essential to mix the blood thoroughly and this should be done by gently swinging the flask with a rotary motion. Any violent shaking or stirring should be avoided since it causes excessive destruction of cells. The blood before use in every case must be filtered through several layers of gauze. Other papers on this subject state that the blood should be warmed before use. This does not seem necessary; in fact unless done carefully it may be harmful and cause feverish reactions. If time permits all that appears necessary is to allow the flask of blood to stand at room temperature for half an hour before use. If the drip technique is used, even this preliminary delay is unnecessary.

We have accepted the fact that the fœtal blood-groups are fixed at birth and have not regrouped the stored bloods before use. As a routine measure direct matching of the recipient's serum and the stored cells is carried out and in no case has an unexpected result been obtained.

We have now given 25 transfusions of stored placental blood and have only once met with a severe reaction. This did not appear to have been due to placental blood but to the development of iso-agglutinins to the cells of the original donor, her own son. Slight rises of temperature have occurred on other occasions early in the series and have appeared to follow undue heating of the blood. As previously stated, we are now of the opinion that it is unnecessary to heat the blood before use.

The following case illustrates the rapid rise in the blood-count in a case of severe internal hæmorrhage.

Male, aged 47. A case of peptic ulceration which developed symptoms of intestinal hæmorrhage on Nov. 6, 1938, whilst in the ward. His blood-count fell rapidly until it reached the low level of 1,450,000 red cells per c.mm. His progress during the next week is shown in fig. 3.

This case also demonstrates that it is possible to mix placental blood from different sources and also with stored blood from a voluntary donor. In our series the greatest number of separate bloods of the same group mixed together has been three and we can see no reason why any number of bloods of the same group cannot be mixed if large transfusions are necessary. We have now in the hospital a patient with splenomedullary leukæmia who has had daily transfusions of placental blood for nine days without any reactions and with considerable clinical improvement.

Length of storage.—We can add no information about the length of time it is possible to store placental blood. Cadaver blood is stored for 60 days. As a rule we have used the blood within two weeks, but we have now in the refrigerator two flasks of group A B and group B bloods which have been in store for over a month and the degree of hæmolysis is minimal.

Among the *advantages of placental blood* over ordinary blood are the fact that it contains no food

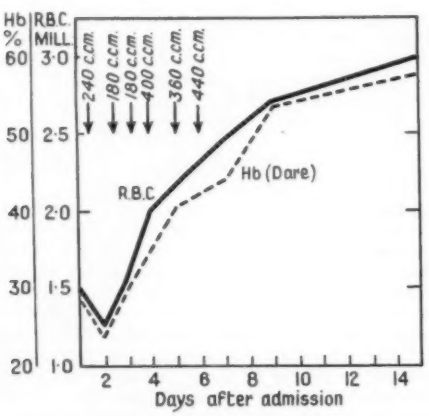

FIG. 3—Post-hæmorrhagic anæmia treated by repeated transfusions (indicated by arrows).

allergens, and that its coagulating effect is 20–25 per cent. higher than that of ordinary blood so that its use in internal hæmorrhage is especially indicated.

SUMMARY

1. Placental blood is a ready and inexhaustible source of supply for transfusion purposes. It is easy to collect and to store in a refrigerator in bulk supplies of the various blood-groups. Blood of the same group can be mixed to provide large transfusions.

2. No abnormal reactions have been encountered during and after actual transfusions. It is unnecessary, and in our view possibly harmful, to heat the blood to body temperature before giving it.

3. Placental blood is preferable to ordinary adult blood because it contains no food allergens and because its clotting-power is greater. The latter is an advantage in dealing with hæmorrhage.

4. A citrate saline solution has been found to be the best anticoagulant, for it gives minimal hæmolysis after prolonged standing.

5. Rigid observance of the technique laid down for sterile collection of the blood is essential if contamination is to be avoided.

We wish to express our thanks to Dr. E. C. Hadley, medical superintendent of the City General Hospital, Leicester, for his permission to undertake this work and for helpful criticism; also to Dr. R. E. M. Fawcett, Dr. J. M. Brown, and Dr. A. W. Abramson for carrying out most of the blood-transfusions.

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TRANSFUSION WITH PLACENTAL BLOOD

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BLOOD-TRANSFUSION still presents us with many problems that await solution. Not the least pressing is that of maintaining an adequate and constant supply of blood. The fact that blood preserved for as long as a month does not apparently lose any of its therapeutic value has helped to solve this problem partially; blood depots have been and are being established in many places (Yudin 1936). A more satisfactory source of blood than the ordinary donor, who is expensive when a professional and uncertain otherwise, is cadaver blood (Goodall et al. 1938) or that portion of fœtal blood which is ordinarily thrown away with the placenta (Vinograd and Finkel 1932).

In the Beilinson Hospital we have introduced the use of placental blood with satisfactory results. The use of preserved blood, especially placental, has another advantage over fresh blood in countries with endemic malaria. To be absolutely safe one must not inject fresh blood from anyone who has at any time had malaria, whereas with placental blood, even if the mother has had malaria recently, the organisms usually do not pass the placental filter, congenital malaria being very rare. Still more important is the fact that in preserved blood the plasmodium quickly dies. Preserved placental blood is thus doubly safeguarded.

TECHNIQUE

The method is simple, requires no special apparatus, and can be carried out in any hospital. In this way we have obtained an average of 50–60 c.cm. at every birth (with a maximum of 160 c.cm.). We simply let the blood flow into the flask from the end of the cord; this is the simplest and, we believe, safest method. Aspiration is not necessary and carried out during a birth is only cumbersome. The simple anti-coagulant, an isotonic (3·8 per cent.) solution of sodium citrate, is all that is required. The various more complicated solutions recommended offer no obvious advantages. The slight hæmolysis (which is harmless) that usually occurs in the first 48 hours cannot be prevented by the use of these complicated solutions.

We keep the blood in a refrigerator at 4°–5° C. for as long as fourteen days. We cultured 48 samples and found 4 contaminated with *Staphylococcus aureus*,

most likely during the obtaining of the blood or during its preservation. No doubt the same proportion of our placental bloods transfused were contaminated but they produced no harmful effects on the recipients. Vinograd and Finkel (1932) report the same and also emphasise the harmlessness of such contaminations. The low temperature at which the blood is kept inhibits the growth of any casual contaminants, and the small number of organisms that may be introduced into the circulation is adequately dealt with by the recipient. We have used no blood from placentas in cases where the mother had fever just before or during labour. Syphilis has to be excluded in the usual way.

As soon as the blood is obtained, its group is determined and the flask labelled accordingly. Before transfusion each blood is separately cross-tested against the blood of the recipient. This may take time when blood from five, six, or more placentas are pooled for a large transfusion, but this check of compatibility is indispensable if one wants to be as safe as our modern methods permit.

RESULTS

Up to now we have given 116 transfusions of blood obtained from 520 placentas. The transfusions were given in various conditions, to children as well as to adults, the amount given varying from 10–15 c.cm. per kg. in infants to 5–10 c.cm. in adults. We are satisfied with our results and, as far as they can be evaluated, we consider them not inferior to those obtained in similar conditions with ordinary fresh blood. In obstetrical complications, for instance, such as placenta prævia, inertia, and atony of the uterus with hæmorrhage, recovery of the patients was as satisfactory and as rapid as after fresh blood. Such cases, in which the need for blood is urgent, cease to be alarming when one is sure that an adequate supply of blood is always at hand, and that there is no need to search for suitable donors in these emergencies.

In our 116 transfusions we have had no serious accidents and only 4 reactions: 3 consisting of a chill and 1 of dyspnœa and tachycardia. The number of reactions recorded depends on so many factors that we cannot compare our results with ordinary donors' blood, but surely they are no worse. We believe that our experience warrants us in concluding that preserved placental blood is equal in value to fresh donors' blood for transfusions. We feel justified in urging the greater exploitation of this source of blood. The throwing away of 50–60 c.cm. of blood with each placenta is a pitiful waste. Our need of blood for transfusions is great, owing to the large number of casualties admitted. In spite of this, we were able, from the time we began to use placental blood, to provide almost the whole of the necessary blood from this source.

SUMMARY

(1) Placental blood was used in 116 blood-transfusions.

(2) Blood preserved in a 3·8 per cent. solution of sodium citrate up to 14 days was used.

(3) The results are considered to equal those obtained with ordinary blood.

(4) Placental blood is an important source of blood for transfusions.

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DIVERTICULA OF THE DUODENOJEJUNAL FLEXURE

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Of late years many papers have appeared dealing with various aspects of diverticula of the pharynx, œsophagus, duodenum, jejunum, and colon, and they are no longer dismissed as anatomical curiosities. Diverticula at the duodenojejunal flexure are rare, and our knowledge of them is limited. Careful clinical study of two cases, together with a study of others on record, has led me to believe that a diverticulum of the duodenojejunal flexure is a clinical entity with definite symptoms and a definite treatment. The lesion may cause serious complications endangering life. The possibility of its presence must be considered in the differential diagnosis of certain abdominal lesions, and if this is done the number of unsuccessful operations—e.g., appendicectomy—will be reduced. A knowledge of the occurrence of a diverticulum in this part of the small intestine is necessary when operations such as partial gastrectomy and gastro-jejunostomy are performed. In this paper the symptomatology, diagnosis, complications, and surgical treatment of the condition are discussed, and detailed case-records of two patients are given. An operation is also described for excision of the diverticulum.

CASE-RECORDS

Case 1.—A woman, aged 68, had for 17 years experienced severe pain localised to the epigastrium and coming on 1–3 hours after food. The pain was not relieved by more food or by alkaline powder. At times the pain radiated to the left shoulder. She woke at 2 to 3 A.M. with pain. There was frequent vomiting, which did not give relief from pain. Heart-burn was present. Because of the pain the patient was afraid to eat. She was constipated, and she had lost some weight.

On admission she was thin and had obviously lost weight. No abnormality was found in the neck or chest. There was some tenderness on deep palpation in the middle of the epigastrium, but no other physical signs.

Radiography after a barium meal showed a normal stomach of good tone with normal peristalsis. In the supine position the rugæ of the stomach were clearly outlined. There was a large flake of barium and an air-cap in the medial aspect of the duodeno-jejunal junction. By positioning the patient and by palpation this flake was seen to be separate from the rugæ of the stomach. Certain radiograms showed this mass to be posterior to the stomach but continuous with the small bowel in this region (fig. 1). This mass of barium was not seen until the meal had passed through the cap into the duodenum. The appearances suggested a diverticulum at the duodenojejunal junction (fig. 2). With the patient supine the diverticulum was at the level of the first lumbar vertebra; in the erect position it was opposite the third lumbar vertebra.

Operation (April 10, 1937).—Exploratory laparotomy through a right supra-umbilical paramedian incision 4 in. long. A detailed examination was made of the abdominal viscera, and no other abnormality was found. The steps of the operation for excision of the diverticulum at the duodenojejunal flexure were carried out as described later.

Post-operative treatment.—The patient was given rectal salines with 5 per cent. glucose every 4 hours for 36 hours after operation. During the first 12 hours following operation nothing was given by mouth; during the next 12 hours the patient was given 1 oz.

of water every 2 hours, and during the next 12 hours she was given 2 oz. of citrated milk alternately with 2 oz. of water every hour. During the fourth 12 hours after operation the patient was put on the third day of the Lenhartz diet. Convalescence was uneventful, and the patient made an uninterrupted recovery. Eighteen months after the operation she is perfectly well and has had no abdominal pain whatever.

Report on specimen.—Dr. L. W. Proger reported as follows: A thin-walled pouch 1 in. in diameter with an opening ¾ in. in diameter (fig. 4). Sections show a lining of chronically inflamed intestinal mucous membrane resting on a narrow layer of muscularis mucosæ, the whole being enclosed in a loose connective tissue sheath (fig. 5).

CASE 2.—An upholsteress, aged 56, attended hospital because of indigestion. She had had indigestion practically all her life, but this had been worse for the past 6 months. Pain was experienced in the centre of the abdomen 1½–2 hours after food. There was a heavy leaden feeling in the abdomen. The pain was relieved by the application of a hot-water bottle. There was no night wakening. There was flatulence but no vomiting. Appetite was good and bowels regular. There had been a small loss of weight. Appendicectomy had been performed 30 years previously. On admission she was healthy, with a clean tongue, and neck and chest normal. There was some rigidity in the epigastrium and tenderness on palpation.

Radiography of the gastro-intestinal tract after a barium meal showed the stomach to be small and J-shaped, with very conspicuous peristalsis. No abnormality of outline of the stomach or duodenum was detected. Subsequent films showed a large diverticulum about 1½ in. in diameter, apparently arising from the duodenojejunal junction (fig. 3). The position of this corresponded to the area of tenderness. At 4 hours there was a small residue in both the stomach and the diverticulum. At 24 hours there was no abnormality of the colon.

Patient is under observation.

SYMPTOMATOLOGY

The history is often long in these cases, and the patient may have experienced symptoms all his life. Pain is felt in the epigastrium and may be referred to the left shoulder. The abdominal pain comes on 1–3 hours after food. There may be night wakening with pain. Vomiting is sometimes incessant and suggests stenosis of the pylorus. Heart-burn and flatulence are often prominent symptoms. The patient may be afraid to eat because of pain after food, and there is usually some loss of weight. On abdominal examination there is tenderness in the epigastrium, and there may be some rigidity in this region.

DIAGNOSIS

Patients presenting these symptoms should be investigated by radiography after a barium meal. Case is credited as being the first to discover diverticula of the duodenum by this method in 1913 and uses the following technique (Case 1920).

The patient is given the usual barium meal, and a brief examination is made in the erect position. He is then placed on his right side, so that gravity may aid in filling niches or sacculations in the pyloric zone. When all is ready for the patient to turn over, the observer, standing on the patient's left, presses strongly with his gloved hand over the duodenojejunal junction, at the same time pushing the contents of the stomach towards the pylorus. The patient is then asked to inhale, hold his breath, and turn quickly on his back, while compression of the duodenum is maintained, thus artificially producing obstruction near the duodenojejunal junction and incarcerating the duodenal contents. Diverticula at the duodenojejunal flexure pass inwards, upwards, and to the right and lie below the lower border of the body of the pancreas. When filled with barium they are seen on the right side of the flexure, and by positioning the patient and by palpation it is found that the shadow is separate from the rugæ of the stomach. The shadow is not seen until the barium has passed through the pylorus and on into the duodenum.

FIG. 4 (case 1)—Duodenojejunal diverticulum. A thin-walled pouch 1 in. in diameter with an opening ¾ in. in diameter.

The following characteristics of the diverticulum should be noted: its situation, its size, its shape,

1 2 3

FIG. 1 (case 1)—Radiogram of duodenojejunal diverticulum 3 hours after a barium meal, showing a large flake of barium posterior to the stomach but continuous with the small bowel.

FIG. 2 (case 1)—Radiogram of duodenojejunal diverticulum 4 hours after a barium meal, showing a large flake of barium in the medial aspect of the duodenojejunal junction (patient supine). By positioning the patient and by palpation this flake was seen to be separate from the rugæ of the stomach.

FIG. 3 (case 2)—Radiogram of duodenojejunal diverticulum about 1½ in. in diameter. This was never fully filled with barium. The fundus of the diverticulum is filled with air.

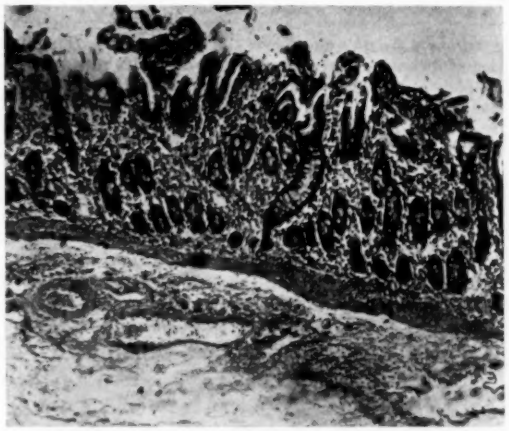

FIG. 5 (case 1)—Duodenojejunal diverticulum. Microscopic appearances of wall of diverticulum. A lining of chronically inflamed intestinal mucosa rests on a narrow layer of muscularis mucosæ, the whole being enclosed in a loose connective tissue sheath. No trace of muscle coat of intestine in wall of diverticulum.

the size of the orifice, its mobility, the length of time barium is retained, and whether there is tenderness. If difficulty is experienced in identifying the diverticulum and its characters, the patient should be examined in the modified Trendelenburg position, which will facilitate the filling of the pouch with barium. In obscure cases the duodenum may be distended with barium through a duodenal tube.

COMPLICATIONS

Clairmont and Schirrz (quoted by Odgers 1930) in 1920 stated: "A diverticulum is a source of all possible dangers for its bearer, and is on this account an indication for surgical interference." The complications which may occur are:—

(1) *Diverticulitis.*—The diverticulum may be the site of any acute inflammation either in the wall or in the peridiverticular tissues. This inflammatory swelling may be severe enough to precipitate acute intestinal obstruction. Krogeus, quoted by Edwards (1935), records a case of acute intestinal obstruction due to a diverticulum at the duodenojejunal flexure in a woman aged 64. Acute inflammation in the wall of the diverticulum may lead to necrosis and perforation with resulting peritonitis or a localised abscess.

(2) *Retention of septic contents.*—If the diverticulum does not empty properly, its retained contents may become infected and cause duodenitis, cholangitis, and pancreatitis. In the case of diverticula in the second part of the duodenum Wilkie (1913) quoted Bauer's case in which a diverticulum was filled with feculent semi-solid matter and there were acute duodenal catarrh, swelling of the papilla of Vater, some dilatation of the bile-ducts, and jaundice.

(3) *Enterolith formation.*—Watson (1924) has reported a case of diverticula of the jejunum in one of which an enterolith had formed whose weight by traction and angulation had caused intestinal obstruction. Watson cites the case of Terry and Mugler in which intestinal obstruction was caused by an enterolith which had formed in a diverticulum of the jejunum.

OPERATION

Surgical treatment of diverticula of the duodenojejunal flexure must always be considered because of possible pathological changes and complications. If symptoms are present and other lesions of the gastro-intestinal tract are excluded and the general condition of the patient is satisfactory, excision of the diverticulum is advisable. Odgers (1930) was able to collect only 23 reported cases of excision of diverticula of the duodenum, but I am not familiar with any description in the literature of the operation for excision of a diverticulum of the duodenojejunal flexure. The procedure carried out in case 1 is as follows:—

The abdomen is opened through a right paramedian supra-umbilical incision 4 in. long. The transverse colon is delivered out of the abdomen and retracted upwards. The transverse mesocolon is thus kept stretched. The upper portion of the jejunum is retracted downwards and to the right, and the duodenojejunal fossa is exposed at the root of the transverse mesocolon. The duodenojejunal flexure is identified lying in the duodenojejunal fossa. The flexure is mobilised by dividing the musculus suspensorius duodeni at the upper border of the flexure, together with the plica duodenojejunalis, which connects the summit of the flexure with the posterior abdominal wall, care being taken to avoid injury to the inferior mesenteric vein, which is lateral to its free border. The peritoneum on the anterior aspect of the flexure is now divided and the flexure inspected. The diverticulum is found on the right side of the flexure, lying somewhat posteriorly, in relation to the left psoas muscle, and below the body of the pancreas. The diverticulum is carefully mobilised, and the flexure is rotated to the left to place the diverticulum anteriorly.

The base of the diverticulum is transfixed with No. 0 chromicised catgut, and the sac is excised. The transfixed base is invaginated into the bowel, and a layer of Lembert sutures of No. 0 chromicised catgut is inserted at right angles to the long axis of the bowel. The divided peritoneum in the region of the flexure is sutured and the abdomen closed.

SUMMARY

(1) Two cases of diverticulum at the duodenojejunal flexure are recorded. (2) The symptomatology, diagnosis, and complications are discussed. (3) An operation for excision of the diverticulum is described.

I am indebted to Dr. Stanley Wyard for permission to publish the records of case 2.

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"... A surgical technician is one who, in conjunction with the surgical and medical profession, designs and produces the tools, instruments and appliances required by them in their profession, and for the use of their patients. ... The technician must at no time assume the status of one having surgical or medical knowledge, and it therefore follows he must not advertise he is in a position to cure any human failing or physical ill. It is especially forbidden that the technician should in any way proclaim, or let it be understood he can cure failings such as Deafness, Hernia, Blindness, Paralysis, etc., or any ailments in connection with the sexual system. ..." (Ethical code of the Institute of British Surgical Technicians.) *Trans. Inst. Brit. surg. Tech.* September, 1938, p. 22.

CLINICAL AND LABORATORY NOTES

THE OXFORD INFLATOR: A SIMPLE RESUSCITATOR

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THE apparatus described here makes use of the fact that the lungs may be inflated by delivering oxygen under moderate pressure to the nose and mouth through a suitable face-piece.

The oxygen passes through the reducing valve into a circular metal pressure-chamber (fig. 1), the upper surface of which is formed by a reinforced rubber diaphragm (A). As the pressure in the chamber rises, the diaphragm is progressively deformed, so relieving the tension of a small coiled spring (C) which is compressed by a pin placed between it and the diaphragm. The spring then thrusts the seating of the valve against the valve-nozzle, and the flow of oxygen diminishes. The degree of pressure required to raise the centre of the diaphragm is determined by the counter-pressure on its upper surface of a second spring (B), the compression of which is regulated by a milled-head screw. By this means it is possible to adjust the pressure of oxygen in the pressure-chamber, and hence at the face-piece, to any desired level. The instrument is calibrated between 20 and 80 mm. Hg.

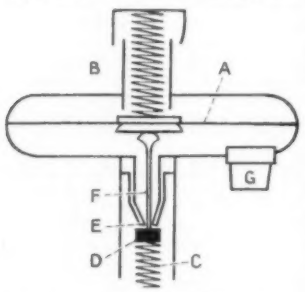


FIG. 1—Pressure chamber. A = rubber diaphragm; B and C = springs; D = valve seating; E = valve nozzle; F = pin; G = safety-valve.

The flow of oxygen to the face-piece is controlled by a hand-operated stopcock (fig. 2). The face-piece is applied firmly to the face. The stopcock is turned to the "inhale" position and held there until the patient's chest is seen to be inflated. Turning the stopcock to the "exhale" position shuts off the supply of oxygen and at the same time permits the chest to be deflated by its own recoil. The frequency of inflation in most cases need not exceed 6–10 per minute.

FIG. 2—Pressure chamber, stopcock, and face-piece in position.

The pressure at the face-piece does not represent the pressure throughout the respiratory passages since there may be a considerable leakage around the face-piece. The leakage varies according to the degree of accuracy with which the face-piece fits the face and to the firmness with which it is applied. The pressure of oxygen should be adjusted so that it just inflates the chest.

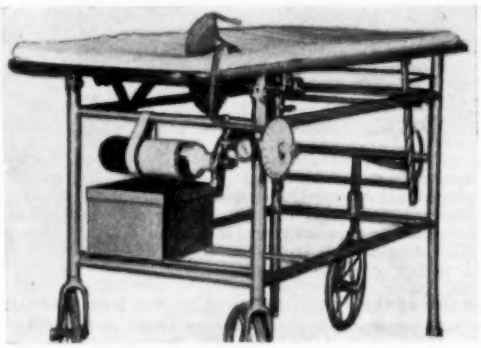


FIG. 3—Portable model.

It should be emphasised that the effective use of this apparatus, as indeed of any method of artificial respiration, necessitates the maintenance of a clear airway. If the patient is on his back or side and unconscious, it is often convenient to insert an airway. There may be some tendency to inflate the stomach as well as the lungs, but this will be slight if the pressure used is not too great. It may be further diminished by a high abdominal pad and binder.

The inflator may be used to maintain respiration in respiratory failure from any cause, but its chief value lies in the urgent treatment of acute and temporary respiratory failure. It is also a useful adjunct to mechanical respirators of the box type in the treatment of chronic respiratory failure, serving for the periods during which it is advisable to remove the patient from the box respirator for nursing and other purposes.

The advantages of this machine are:—

(1) *Cheapness.*—The cost of the reducing valve is £10 10*s.*, including stopcock and face-piece.

(2) *Portability.*—The only difficulties of transport are those

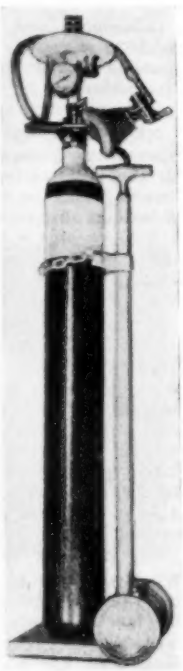


FIG. 4—Standard model.

of an oxygen cylinder. Cylinders of any size may be used.

(3) *Simplicity of use.*—The only operations involved are (*a*) turning on the oxygen at the cylinder, (*b*) adjusting the pressure to the desired level by turning the milled-head screw, and (*c*) operating the lever of the stopcock.

(4) *Independence of source of electricity.*—It can therefore be instantly used anywhere.

The inflator is in use at this hospital in two forms. The portable form (fig. 3) utilises a 120 gal. cylinder and is mounted upright on a two-wheeled trolley for ease of manipulation. The non-portable model (fig. 4) has a 60 gal. cylinder carried by a bracket on a standard anæsthetic trolley.

The apparatus is sold by A. Charles King Ltd., 34, Devonshire Street, W.1, for whom the reducing valve was made by the British Oxygen Co. We are indebted to Mr. Talley, of the former firm, for help with constructional details.

DIURESIS FOLLOWING ADMINISTRATION OF SULPHONAMIDE IN RENAL ŒDEMA

BY A. W. D. LEISHMAN, D.M. Oxfd, M.R.C.P.

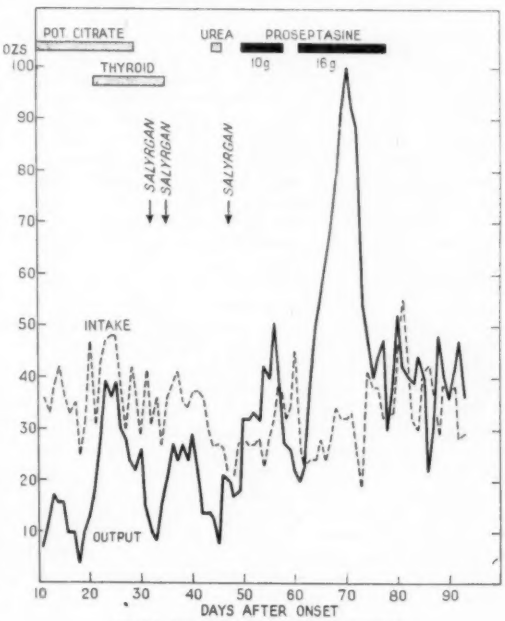
THE gratifying though unexpected effect of a sulphonamide preparation on a patient with severe œdema prompts me to place on record the following case.

A schoolboy aged 12 years, previously in excellent health, was taken ill on July 8, 1938, with nausea, vomiting, and vague abdominal pains. These symptoms soon subsided but he remained tired and listless and had no appetite. A week after the onset he was noticed to be puffy under the eyes and to have some swelling of the ankles. The urine was then examined and albumin was present in large amount and a centrifuged deposit showed many hyaline and a few granular casts but no red or white blood-cells or organisms. The boy was afebrile and remained so throughout the illness though his pulse-rate was consistently raised. The fauces and tonsils were healthy; the cardiovascular system was normal; blood-pressure 120/64; and the retinal vessels and fundi showed no changes. The blood-urea at this time was 54 mg. per 100 c.cm., but a fortnight later it had fallen to 29 mg. The boy was evidently suffering from a renal œdema and there seemed some justification for a diagnosis of nephrosis, but it was impossible to find any underlying cause for the condition.

Treatment.—He was given a salt-free diet which was first of low-protein type. Later a high-protein diet was tried but this caused such gastric disturbance that it had to be abandoned. The total fluid intake was restricted to about two pints a day and various attempts were made to increase the urinary output. Potassium citrate was given to the limit of tolerance, thyroid extract up to 3 grains a day, urea in 15-gramme doses, and Salyrgan both by suppository and intravenous injection. Vitamins B and C and iron were given throughout. In the critical stages hot-air baths were tried. Of these measures the only one which seemed to increase the output of urine to any extent was thyroid extract and this had but a temporary effect (see chart).

Progress.—For the first ten days after the appearance of the œdema the urinary output was desperately low and the albumin content correspondingly high, rising to as much as 3 g. per 100 c.cm. After some slight temporary improvement the œdema rapidly increased and soon became generalised. The boy's face was unrecognisable, his scrotum and legs were enormous, and his abdomen was distended with ascites, though the pleural cavities remained dry. Vomiting was an additional disturbing feature and the boy's condition became critical. A specimen of urine examined microscopically at this time contained considerable numbers of coliform bacilli but no excess of pus cells or red blood corpuscles, though there were still many hyaline casts.

No bladder symptoms were complained of, but in view of the gradual increase in the urinary infection a course of Proseptasine was given. The maximum dosage was 1·5 g. a day by mouth and this was soon dropped to 1 g. and then to 0·5 g. The drug was given first for eight days and after a three-day interval for another seventeen days. The total dose in the first course was 10 g. and in the second 16 g. The effect of this treatment soon became apparent. In the second week particularly, as is shown in the



Fluid intake and urinary output.

chart, the daily output of urine rapidly increased, reaching a maximum of 100 oz. Following this diuresis the œdema visibly subsided and by the twenty-eighth day of this treatment there was no trace of œdema or ascites. The urine at this time was free from organisms, pus cells, or casts, and contained only a slight cloud of albumin.

From time to time the bacilluria has recurred and with it there has been an increase in the albuminuria, but these have been controlled by further courses of proseptasine and there has been no return of œdema. When last seen on Nov. 24 the boy's urine was normal in every respect and his general condition was good.

DISCUSSION

The main difficulty in this case is to assess the part played by the *Bacillus coli* infection. In the early specimens of urine there was no sign of infection and there seemed good reason for a diagnosis of nephrosis. If the infection was the basis of the renal syndrome the pathology of the condition is somewhat obscure for it is difficult to picture any form of pyelonephritis without pyuria and without fever. It seems more likely that the urinary infection was a secondary event which depressed still further the already ineffective renal function. Proseptasine is not known to have any specific diuretic action, and it is presumed that the kidneys were able to regain their efficiency only when, by the action of the drug, the extra burden of infection was lifted.

I wish to express my thanks to Dr. H. Girling for permission to publish this case.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF PHYSICAL MEDICINE

AT a meeting of this section held on Jan. 20, Dr. K. R. COLLIS HALLOWES, the president, took the chair and a paper on the

Physiological Aspects of Rheumatism

was read by Prof. SAMSON WRIGHT. The whole problem of the mechanism of the sense-organs, he said, had been investigated recently by electrical means and certain principles established. The intensity of a sensation was associated with the frequency of nerve impulses. The extent depended on the number of nerve-endings and fibres, and therefore the area of cortex activated. The quality was difficult to account for, and depended on something unanalysable in the brain. The sensory cortex "secreted" conscious sensation, as a gland secreted saliva. Pain was thought to be a function of the thalamus or other subcortical areas. Pain was a function in itself, not a degree of intensity. A complete description of a pain should include its severity, kind, relation to time, locality, and circumstances. Lewis had described three kinds of somatic pain: from skin, muscle, and tendon respectively. If brief, a skin pain was felt as a prick; if more prolonged as a burning sensation, irrespective of cause. Muscle pain was continuous, diffuse, and difficult to locate; it could be produced experimentally by ischæmia, squeezing, or injecting certain solutions. It might be referred. The pain of tendons, fasciæ, and periosteum could be produced by pinching the web between the fingers. Diffuse pain could be relieved by injecting solutions into localised tender spots.

Ischæmic pain rapidly became intolerable. It was not due to spasm of blood-vessels or to muscular tension. It was produced by activity. Probably it was due to some chemical product—the pain-factor metabolite—formed under conditions of anoxæmia during muscle activity. Products of muscle injury might be important in relation to massage. When a muscle contracted, glycogen, phosphagen, and adenyl pyrophosphate all broke down, and the breakdown of glycogen was by no means essential to contraction, fatigue, and rigor. Many other unknown reactions occurred. These three breakdowns were anoxæmic, but oxygen was required for the combustion of lactic acid, fat, and other foodstuffs, and for the re-formation of glycogen. Muscle activity or damage liberated choline or acetylcholine, histamine, adenosine, the P (pain) factor of Lewis, the factor of Smirk (which produced reflex rise of blood-pressure and pulse-rate), and a pressor substance. Choline, histamine, and adenosine were all vasodilators. All these factors might produce both local and distant effects.

The flow of fluid to and from capillary and tissue spaces depended on the balance between capillary blood-pressure and the osmotic pressure of the plasma proteins. Metabolites might be osmotically active and suck fluid into the tissues. Only a small proportion of tissue-space fluid entered the lymphatics, which were not believed to play much part in tissue exchange. The tissue changes accompanying muscle contraction all favoured more extensive exchange. In an active muscle 2 c.cm. of fluid per 100 g. of muscle might exude per minute. Apart from contraction, flow of fluid into muscle spaces was encouraged by giving saline or water, by mouth or any other route. Saline lasted much longer in the body than water. Fluid was removed from the muscle spaces by sweating or any fluid-loss. Remarkable claims were made in books on massage, and needed physiological investigation. Very light superficial stroking caused an active contraction of local capillary walls, unrelated to any nerve-supply. More vigorous stroking would provoke varying degrees of vasodilatation. Firstly there was a capillary dilatation giving a red line; then a red flare due to arteriolar dilatation based on axon reflex; and thirdly a weal. These reactions were due to histamine-production. If the stroking were centripetal the flow in superficial vessels might be accelerated, which might be of value if the circulation were impaired. Stress should not be laid on any lymphatic effect. The normal flow in a lymph-vessel was very slow and was only increased by pathological changes or activity; massage was comparatively ineffective. Little was known about skin metabolism, and speculations as to the results of massage on it were idle. There were few adequate clinical observations on the reflex effects; experimentally almost any effect could be produced by varying the circumstances. In man the effects probably varied with the nature of the stimulation. Deep stroking would produce greater results of the same kind. The minute tissue damage caused by it might produce enough metabolites to bring about remote effects.

Pressure, friction, and percussion movements also had great claims made for them. They could not remove fat without causing serious tissue damage, and if the fat were removed it would only be deposited elsewhere. Uric and butyric acid were said to be removed, but they were never found in muscle. Vigorous massage did not increase oxygen-consumption, carbon-dioxide output, or heat-production; there were no recognisable changes in blood or urine, nor evidence of improved muscle nutrition. There was a slight increase in blood-flow, but this was very small compared with that produced by muscular activity. Blood-pressure might be altered by increasing venous return or causing capillary dilatation in the muscle. It was doubtful if any effect would be produced on denervated muscle. Stretching produced reflex contraction or relaxation according to the force used, and also distant reflex changes. Reactive hyperæmia by arterial obstruction perhaps deserved more extensive use in this country. The higher the external temperature and the longer the occlusion the greater and more prolonged the effect. The hyperæmia was comparable with that obtained from a period of activity. Similar effects followed venous obstruction. The hyperæmia was accompanied by capillary and arteriolar dilatation, and increase of pulse-volume and temperature, probably due to release of metabolites produced in the occlusive period. Tissue-fluid interchanges must undoubtedly be increased.

Artificial hyperpyrexia was increasingly used; it brought the patient very near the limit of tolerance. An insulated man's metabolism was vigorous enough to raise the body temperature 2° per hour; a corresponding steel body would rise 16° in an hour. Insensible perspiration was not due to sweat-glands at all; it was most marked on the palm and sole and almost negligible on the body, apart from the face.

Sweating from the palm and sole was negligible and chiefly occurred from the forehead, back of hand, and chest. Heat-loss was primarily due to sweating and evaporation. The electropyrexial technique was said to produce a smaller increase in pulse-rate than other methods; 4000 or 5000 c.cm. of sweat might be lost in 4 or 5 hours. The pulse-rate might rise to 160 per minute. The blood-pressure might rise or fall; the diastolic pressure might even fall to zero, and this must seriously embarrass the heart. Cardiac accidents were not surprising. Respiration might become irregular with long bouts of apnœa and even arrest. A marked alkalæmia occurred. Water-loss, uncompensated by administration of saline, might cause increase in viscosity and concentration, and in the red-cell and hæmoglobin content, and other serious changes.

Dr. W. KERR RUSSELL said that four methods of artificial hyperpyrexia had been tried at the National Temperance Hospital. Nebulised hot water was now being used and patients much preferred it—probably because there was so much less sweating. Tetany had occurred on one or two occasions with the earlier methods—undoubtedly due to chloride loss—and there had also been trouble with cramps and indigestion due to chloride loss. The new method had stopped all these and relieved all fear of burns. Six hours at 106° F. could be tolerated.

Dr. J. C. BUCKLEY thought an accurate datum line of normal physiology was essential in the estimation of therapeutic results. He asked whether Prof. Wright could throw any light on "fidgets": a sensation, chiefly felt in the calf, when trying to get to sleep, that one must "do something" with a muscle. Was it a minor form of ischæmic pain? It came on when the muscle was at rest and was relieved by exercise. He profoundly disbelieved in "the rubbing away of fibrous nodules"; that was an example of mistaken conclusion. The only "nodules" that could be rubbed away were local areas of spasm. A Bier's bandage invariably produced a rise of general body temperature; was this result due to mild autoinoculation or to products of normal metabolism?

Sir WILLIAM WILLCOX said that if the application of physical medicine did not agree with physiology there was something wrong with it. In practice, massage suitably applied by a suitably chosen masseuse did an enormous amount of good. Much more importance was attached to the lymphatic system on the Continent. Attention should be more directed to the dangers of hyperpyrexia; convulsions commonly occurred, and even hemiplegia might follow. He doubted whether it were wise to practise hyperpyrexia in an outpatient department without beds.

Prof. GEOFFREY HOLMES pointed out that text-books of physiology were not very helpful to the physiotherapist who wanted to keep up to date. He asked for an explanation of the pain of acute lumbago, and of its instant relief by efficient strapping.

The PRESIDENT asked whether susceptibility to stiffness were due to peculiarities in the rheumatic subject. It responded well to heat, massage, and douches.

Prof. SAMSON WRIGHT, in reply, said he did not know why he had benefited from massage, and preferred no reason to facile and pseudoscientific ones. "Fidgets" and stiffness would be interesting subjects for research. Few of the phenomena in muscle could as yet be explained.

SECTION OF NEUROLOGY

AT a meeting of this section held on Jan. 19 with Dr. J. G. GREENFIELD, the president, in the chair, a discussion on the

Neurological Complications of Pregnancy

was opened by Dr. W. RITCHIE RUSSELL. He admitted at the outset that these conditions were nearly all very rare. They were, however, interesting because the accurate diagnosis might be difficult, their occurrence during pregnancy might throw light on their ætiology, and the effect of pregnancy on an established disease was important. Coma presented a difficult problem in diagnosis when the patient showed no signs of eclamptic toxæmia. Many of these patients were found post mortem to have vascular lesions of the brain, but all the possible causes of coma must be kept in mind and a full investigation made without delay. Recent studies of the circulation in eclampsia emphasised an abnormal tendency to vascular spasm, which might explain many of the cerebral and retinal changes. Another cause of coma might be Wenicke's encephalopathy, and investigators had pointed out a frequent association with hyperemesis gravidarum. Some combination of deficiency factors might be responsible. Chorea gravidarum seemed to be identical with rheumatic chorea, but the infection did not account for all the symptoms; some metabolic or deficiency factor must be concerned. The various deficiencies of pregnancy offered a fruitful field for research. Polyneuritis usually responded to vitamin B_1. Severe polyneuritis gravidarum was uncommon, but the earliest symptoms—tingling and numbness in the extremities and loss of appetite—were not infrequent. A high-carbohydrate diet increased the body's requirement of the vitamin. Pressure of the fœtal head on the pelvic nerves in later pregnancy often caused discomfort or traumatic neuritis, which showed itself in motor, sensory, and nervous disturbances. When the paralysis and sensory loss affected only the lower leg the neural damage was most probably not in the pelvis but caused by pressure on the common peroneal nerve or the tibial nerve near the popliteal fascia. Such patients recovered gradually over several months. Infection of the pelvic tissues might cause severe and painful neuritis and weakness in the legs.

Dr. H. L. SHEEHAN, summarising the results of a large number of autopsies on obstetrical patients, said that one of the main diagnostic difficulties was caused by patients admitted with coma or convulsions and labelled as eclampsia. Meningitis was commoner than might be expected, and was mainly meningococcal. Cerebral embolism was always due to acute endocarditis. The symptoms were sudden coma and hemiplegia without fits. Some cases of epilepsy went on to fatal status epilepticus. Epilepsy closely imitated eclampsia and probably accounted for many recorded cases in which there had been frequent fits. Eclamptic lesions were never found in the brain or organs. Small cortical gliomata might produce fatal epilepsy. Of greater interest was puerperal thrombosis, which included cases in which the thrombosis occurred in the meningeal veins where they entered the superior longitudinal sinus. The thrombosis produced an area of softening in the cortex an inch or two in diameter. After a normal delivery and puerperium with no clinical evidence of sepsis, the patient would suddenly, between the third and the tenth day, develop fits and coma. This condition accounted for nearly all the reported cases

of late eclampsia. The last and by far the largest group consisted of hæmorrhages and softenings. Patients who died of eclampsia, or of coma supervening on pre-eclampsia, usually had no gross cerebral lesions. Congestion or œdema of the brain must be viewed with suspicion, because they were often artefacts of the autopsy. In over a third of the eclampsias and pre-eclamptic comas, cerebral hæmorrhages or softenings could be recognised with the naked eye. Microscopically there were thrombi in some of the capillaries, which gave a fibrin-staining reaction but were peculiarly colloid in their appearance. These lesions appeared to be secondary to some gross vasomotor disturbance in the cerebral vessels accounting for the convulsions and coma but not sufficient in most cases to give rise to hæmorrhage or softening. If these occurred the eclampsia was probably fatal whatever the degree of the cerebral lesions.

Diagnosis was very difficult. Severe cyanosis suggested a large pontine hæmorrhage, and an unvarying hemiplegia suggested a lesion in one side of the hemisphere. Death in cases of hyperemesis was due to abortion or postoperative shock, or to a peculiar cerebral syndrome. There was about seven weeks of severe vomiting, which stopped suddenly, the pulse-rate remaining high. The patient became apathetic, developed nystagmus and tenderness of the leg muscles, and, after a short period of mental confusion, died in coma. The condition was so clearly cerebral that it was sometimes diagnosed as encephalitis. The question whether Wenicke's lesion was responsible for these deaths would only be answered when further studies had been made in the light of recent knowledge of where to look for the lesion.

Dr. REDVERS IRONSIDE described four types of neuritis, of which the first was associated with achlorhydria but not with toxæmia, began with the fifth or sixth month, and was sometimes accompanied by Korsakoff's psychosis. It cleared up a variable time after delivery. Differential diagnosis must be made from the effects of alcohol and abortifacients. Polyneuritis following hyperemesis gravidarum was a rare and dangerous condition. The symptoms were similar to those of any other toxic polyneuritis. Vomiting was severe and incessant at first but might abate before the onset of the polyneuritis, leaving a latent period of one to three weeks. The patient's helplessness might be wrongly ascribed to prostration. Usually the highest terminals of the nervous system became involved when Korsakoff's psychosis appeared. Tachycardia was almost always present, with bulbar signs or respiratory paralysis in the gravest cases. Nystagmus was especially characteristic and might be accompanied by unilateral or bilateral nerve-deafness. The condition cleared up speedily after parturition. Achlorhydria was often reported. Some work had been done on the estimation of vitamin-B_1 excretion, but was handicapped by the absence of a satisfactory method of assay. The evidence for deficiency of the vitamin was slender and the symptoms of it were never comparable to the acute cardiac death of pernicious beriberi, nor to the massive œdema of the wet forms. The infant did not appear to suffer from disquieting symptoms. Pregnancy could not be the cause of the syndrome, because there was no firm temporal relation between the two. The mortality was very high. The polyneuritis would often recur with each pregnancy.

The fourth variety of polyneuritis complicating pregnancy was parturitional paralysis due in part to pressure of the fœtal head on the fourth and fifth lumbar roots, or pressure on the peroneal nerve by the strap hitching up the knee on the obstetrical table; or traction on or trauma of the lumbosacral plexus. The condition was very rare.

Dr. H. G. GARLAND dealt with neurological problems other than those directly resulting from pregnancy. Inherited conditions might be divided into those in which the inherited factor was predominant, and those in which the causal factors were multiple. An elementary knowledge of mendelism was essential. Certain conditions were inherited as simple dominant abnormalities. Probably all the children of a parent with Huntington's chorea should be advised against marriage, though half of them would in fact be normal. Hypertrophic polyneuritis was inherited in the same way, but was usually not very severe and did not appear to increase in severity with succeeding generations. Von Recklinghausen's disease introduced the difficulty of great variation in severity. Progressive muscular atrophy, certain cases of myopathy and dystrophia myotonica, and probably also familial periodical paralysis were also heritable, but the chance of inheritance was only one in four. In sex-linked conditions the difficulty of prognosis for offspring was much greater. Certain less well-defined conditions were inherited, but the exact mode was not clear—e.g., epiloia.

An entirely different problem was raised when the inherited factor was only one of several, as in migraine and epilepsy. The tendency to attacks of migraine was certainly a simple dominant, but migraine was probably never so severe in itself as to constitute a eugenic problem. On the other hand, all neurologists agreed that there was an inherited factor in epilepsy. If a patient suffered from fits of the idiopathic type and his family history showed no epilepsy, and he had no consanguinity with the woman he proposed to marry, the risk of transmitting a tendency to epilepsy was probably negligible. If migraine was associated with epilepsy in the family history, the risk might be two-thirds as great again as if the family history showed only epilepsy. Disseminated sclerosis was the most important of the neurological conditions which might be aggravated by pregnancy, for pregnancy sometimes precipitated the onset, and more often increased the disability A relapse apparently due to pregnancy was sometimes, however, followed by spontaneous remission. Termination of pregnancy might cause as much damage as labour, and the best treatment was probably complete rest. Hypopituitary syndromes were usually associated with chromatophobe adenoma with increased intracranial pressure, but sexual function might remain normal in the presence of suprasellar adenoma. Similarly, menstruation and pregnancy might occur after operation for acromegaly, and exacerbate the symptoms. Amenorrhœa was usually a striking feature of pituitary basophilism. Sympathectomy had been found to cause an unusual incidence of abortion and stillbirth in cats; the possibility of bilateral lumbar sympathectomy producing a similar result in women should be borne in mind.

DISCUSSION

Mr. W. C. W. NIXON confirmed, from his experience in Hong-Kong, the infrequency of polyneuritis due to lack of vitamin B_1 in pregnancy, although the incidence of wet beriberi among parturient women in his clinic was 30 per cent. Dry beriberi appeared to break out six or eight weeks after delivery.

Dr. H. M. SINCLAIR referred to an article published about a year ago in the Hong-Kong University medical journal which stated that a large proportion of women had shown a definite connexion between beriberi and pregnancy. Acute cases of vitamin-B_1

deficiency were generally marked by cardiac symptoms. Only when a deficiency had existed for some time were neuritic symptoms prominent. The pregnancy itself was more important than the high-carbohydrate diet. Capillary hæmorrhages were not found in vitamin-B_1 deficiency. Injection of the pure vitamin was dangerous, and it should rather be given in the form of a yeast preparation.

Dr. J. PURDON MARTIN considered that the clinicians at the meeting had not spoken on the same subjects as the pathologists. He doubted whether, apart from hyperemesis, there is any such thing as a polyneuritis of pregnancy, or whether the incidence of polyneuritis is greater in pregnant women than in the general population. Gestational foot-drop was one of the commoner complications, and the explanation by pressure on the nerve-roots was not altogether satisfactory. Unless chorea gravidarum was severe, the physician should temporise and try treatment before considering abortion. He would have considered subarachnoid hæmorrhage more likely to occur in pregnancy than at other times. The severe vascular lesions causing hemiplegia and paraplegia were usually associated with high blood-pressure, which was probably a pre-eclamptic condition. The cause of paraplegia during pregnancy was generally disseminated sclerosis. In an interesting group of cases convulsions occurred after delivery and left a hemiplegia: three out of four patients had made good recoveries and in the fourth case autopsy had revealed a thrombosed vein. He had seen only two cases of visual disorientation both in women recently confined. It did not seem to arise from arterial lesions or tumours. The delivery of patients with spastic states was usually normal but somewhat rapid.

Dr. MACDONALD CRITCHLEY declared that tingling and pins-and-needles were extremely common in pregnant women. Hippocrates had described paralysis in women in whom the lochia had been suppressed. He agreed with the orthodox view that parturitional foot-drop was due to pressure on the roots which went to form the sciatic nerves within the pelvis. There was nearly always a history of relative disproportion between the fœtal head and the pelvis, prolonged and difficult labour, and persistent occipito-posterior presentation. The reason why foot-drop was the only sign of paralysis was that the nerve-roots rested externally upon the unyielding ischium but internally upon the soft musculus piriformis, and therefore only the external popliteal nerve suffered. Vascular accidents were almost an unwritten chapter in neurology. Disseminated sclerosis was a positive indication for terminating pregnancy in the first three months, but afterwards the trauma of artificial abortion was greater than the probable injury of a confinement. Postencephalitic parkinsonism was, however, an absolute indication for terminating pregnancy.

"... A policy for defence must take account of social welfare as well as of armament production and civil defence. National fitness in the widest sense is an indispensable element in national defence. Wisely conceived, a policy for defence will take account not only of physical training, nutrition, overcrowding, unemployment, and other factors affecting the health of the nation. It will have regard also to many of the amenities of life which determine the mental and moral as well as the physical fitness of the people."—Leading article, *Nature, Lond.* Jan. 21, 1939, p. 93.

MEDICAL SOCIETY OF LONDON

AT a meeting of this society on Jan. 23, with Dr. C. E. LAKIN, the president, in the chair, a discussion on

Poliomyelitis and Artificial Aids to Respiration

was opened by Sir HENRY GAUVAIN. He referred members to a publication of the public health committee of the London County Council for detailed and valuable information on the subject. The treatment of anterior poliomyelitis should, he said, be carried out by orthopædic surgeons. Early acute cases treated with skill from the onset had the greatest chance of recovery. Mobilisation of paralysed muscles and relaxation should be enforced from the start. Splints should be applied immediately, for contractures developed rapidly and damage to paralysed muscles was often irreparable. There had been an unusual number of cases in 1938, with a high incidence of respiratory failure. His hospital had admitted 87 cases, 35 of them less than a month from the onset. Of these, no less than 7 had been treated in a respirator of the Drinker or Bragg-Paul type. He gave details of these cases, of which 2 had been fatal: one patient was a woman of 37, who died with severe hæmorrhage of internal organs, and one had developed epileptic fits and died in status epilepticus. Two other patients had made good recoveries from their respiratory paralysis, but satisfactory splinting could not be obtained in the Drinker apparatus.

Sir Henry gave a summary of the rules for nursing respirator cases, drawn up by his sister in charge of respirator treatment, Miss Hadley. All pressure points should be padded with cotton-wool. The patient wore a nightgown opening down the back, and a collar, made of a double thickness of lint well greased, to prevent abrasion from the rubber diaphragm of the apparatus. An electrical sucker should be fitted to remove mucus from the throat. If the patient were wearing a back-splint, a tin shoe should be applied. If the arms were paralysed, a long hand-splint should be fitted, with extra padding at the wrists. The bedpan should be of rubber, well padded, and was handed through a large port in the apparatus. When the patient was to be withdrawn for nursing and treatment, everything should be ready and good team-work was essential. He should be reassured and the process explained to him. He must be persuaded to make an effort to breathe, for the respirator had a strong psychological effect: the patient was often terrified of it at first but was afterwards equally terrified of losing its protection. The motor should be left running while he was withdrawn. In the early days he should be given oxygen continuously through nasal catheters while the back and pressure points were being treated. As the condition improved, his time outside the respirator should be increased, but bathing should not be attempted unless he could remain out of the respirator for a quarter of an hour. A respiration chart should be kept. Perspiration was the first sign of respiratory distress. He should be encouraged to sleep while outside. When he was able to stay outside for three or four hours he could be placed on a bed beside the apparatus in the ordinary position and his neck-piece could be removed and the motor stopped. When he could stay out all day he should be taken out for the whole of a second day, but on the third day left in the respirator and only withdrawn for treatment. If the condition was satisfactory, the apparatus

could be dispensed with all night; the sound of the motor had a reassuring effect. The patient was fed through a pipette if he could not suck, and as he recovered the diet was gradually strengthened. A fluid-intake chart should be kept. In catheterising for retention of urine everything should be ready beforehand, and if the patient showed cyanosis he should be returned to the respirator for a few minutes with the catheter in place.

Sir Henry expressed the general gratitude to Lord Nuffield for his gift of a respirator to every hospital, but pointed out the necessity for a team who were ready and available at all times and could use it properly. If the respirator were handled unskilfully, the child would probably die. The apparatus required careful maintenance when not in use. Acknowledging the courtesy of the Nuffield Trust, he showed films illustrating several types of apparatus for the mechanical production of respiratory movement. Total enclosure apparatus was represented by the Drinker and the Both machines. The Bragg-Paul Pulsator was a pneumatic jacket for applying rhythmic positive pressure; Sir Henry said it was very convenient and effective. The Burstall applied negative pressure and resembled a cuirass. The Biomotor, a German apparatus, was a large helmet which was strapped to the abdomen and inflated the lungs by applying rhythmic negative pressure. Other apparatus included the tilting stretcher, on which a prone patient could be rocked through an angle of 45° each way, respiration being brought about by the movement of the abdominal contents. Simpler methods were to roll the patient backwards and forwards on a wine-barrel, and to lift and lower him rhythmically by means of a sling slipped under the abdomen in the prone position. Oxygen cylinders could be fitted with masks of the anæsthetic type and a control valve operated mechanically or by hand, as in the McKesson or the Oxford apparatus.

Dr. C. P. SYMONDS spoke of problems of diagnosis, treatment, and prevention. He explained the differential diagnosis of poliomyelitis from acute febrile polyneuritis, in which the paralysis developed more slowly and was more symmetrically distributed, and there was some evidence of sensory involvement—usually paræsthesiæ. Recovery was always complete unless death took place from respiratory paralysis in the early stages. Some of the reported cases of complete recovery from infantile paralysis might have been wrongly diagnosed. The diagnosis of poliomyelitis in the preparalytic stage was extremely difficult except in an epidemic. The mental symptoms—restlessness, irritability, and stupor—might be more prominent than the fever, and suggestive of encephalitis. Paralysis was often preceded by symptoms of brain-stem involvement, including difficulty in swallowing fluids, nasal regurgitation, diplopia, and nystagmus. Bulbar involvement might be shown by attacks of rapid respiration so prolonged as to resemble tetany. The cerebrospinal fluid in the early stages showed considerable variety but might be quite normal, and, if not, usually fell to normal rapidly. The protein, on the other hand, often continued to rise in the second week and might remain high until the end of the fourth week. Serum treatment appeared to be actually harmful, and a carefully controlled study by W. H. Park in New York in 1921 had shown a result slightly in favour of the controls. Recently fresh claims had been made for serum treatment by orthopædic surgeons in this country, claims which unfortunately might lead the public to think that practitioners who did not use serum were either ignorant or lazy.

In Great Britain little was known about poliomyelitis and there had fortunately been next to no experience of its epidemic form. The virus here might be of a weak strain. The disease was sometimes regarded as not very infectious, but this was a dangerous belief. Dr. Symonds gave examples of the ease with which the infection might be contracted, and repeated the recommendations of Sir Arthur MacNalty: patients should be isolated for six weeks and personal association with them limited to what was immediately necessary for proper care and nursing; and children in an infected household should remain away from school for three weeks after the isolation of the last patient. Age was the most important factor in natural immunity, and all nurses should be over 25. Indoor contact with persons under 21 should be avoided. Kissing should be prohibited, and suspects should use paper handkerchiefs and burn them immediately. The infection was undoubtedly by droplets obtaining access through the nose and pharynx. These precautions should be applied to children returning to school where an outbreak had occurred. On the first sign of the disease in a residential school all parents who could do so should remove their children by motor-car and adopt these precautions under the supervision of the family doctor. Children should not return until three weeks after the isolation of the most recent case. He much preferred the Bragg-Paul apparatus to the Drinker, for its extreme simplicity and convenience to the nurses and because it was far less frightening to the patient.

Mr. B. WHITCHURCH HOWELL compared the present epidemic with that which had broken out in Essex in 1926 and which had not produced so many deaths from respiratory paralysis. The present form was much more virulent and the permanent paralysis more severe. He would put a child of his own, if it were conscious, in the Bragg-Paul respirator, which was very comfortable and allowed the orthopædic surgeon to splint all four limbs simultaneously. A dramatic feature of the cases in both epidemics had been that immediately on mobilisation irritability had disappeared, the temperature had become normal, and the patient had slept. The appetite had then reappeared and the general health, and eventually the muscle power, had started to improve. Suspects should be kept prone while there was doubt of the diagnosis. The incidence appeared to be high in mid-winter as well as towards the end of summer. Care should be taken not to remove a patient from the respirator too soon; Mr. Howell had known of a recent death from this mistake. He asked whether the physician or the nurses wore masks when in contact with the patient.

Dr. J. B. WRATHALL ROWE asked whether an antiseptic should be applied to the nasal mucosa for prophylaxis or treatment.

Mr. D. H. KITCHIN referred to the work of F. C. Eve on the tilting stretcher and to the recent report by J. A. Kerr of a case of poliomyelitis with respiratory paralysis treated on a tilting stretcher for nine days (*Lancet*, Jan. 7, p. 24). The advantages claimed for the device were that it could be improvised where no electrical apparatus was available, and nursing was convenient. He asked for an opinion on its merits compared with the Drinker apparatus.

Dr. S. SUZMAN asked what proportion of cases died in the Drinker or Bragg-Paul apparatus.

Sir HENRY GAUVAIN, in reply, said that in his experience nearly every patient who had been placed in the respirator had been comatose. Patients had been terrified on waking but had soon become

reassured, and fear was therefore not important. It was easy to place back-splints or tin shoes on a patient in a Drinker apparatus, and in the latest type the arms could be abducted. He preferred light metal splints to plaster in the acute stages. He had found the Drinker apparatus invaluable in his hospital. A disadvantage of the Burstall negative-pressure respirator was that it had to be kept in different sizes. Patients in the Drinker respirator must be encouraged, and it was essential to have a sister who thoroughly understood the psychological difficulty and knew how to withdraw the patient. His nurses wore masks and gowns, but he thought that a virus that would pass the finest filter could not be kept out by a mask, and did not wear one himself. He did not consider that the tilting stretcher would be efficient in poliomyelitis, and its use by hand for prolonged periods would be impracticable.

Dr. SYMONDS, also in reply, could not agree that the mask was inefficient: it would not stop a virus but it might stop droplets. Without seeing the results of a full histological examination of the two cases which had died from internal hæmorrhage, he was inclined to question the diagnosis.—Sir HENRY GAUVAIN assured him that this examination had been made, and undertook to send him the material.

MANCHESTER MEDICAL SOCIETY

AT a meeting of the society on Dec. 7, Dr. A. R. SOMERFORD opened a discussion on

Gold Therapy

Some authorities may claim, he said, that they use gold salts in treatment without producing any untoward reactions, but this is not the experience of most observers. Some have noted reactions in as many as 45 per cent. of their cases, though they were often mild. Reactions may arise at three stages—within a few hours of the injection, including the so-called grippe aurique; during the course of treatment, including urticarial, morbilliform, and scarlatiniform eruptions; or after the cessation of treatment, possibly several weeks later, and at this stage it is not uncommon to find evidence of blood, hepatic, or renal damage in addition to skin eruptions. Reactions have been variously ascribed to hypersensitivity to gold, biotropism, the toxic effects of products resulting from the action of gold on the tissues, and faulty elimination by the kidneys due either to pre-existing deficiency or to renal damage produced by the gold. Whatever the cause, it is wisest to regard all reactions as signs of gold intolerance and to terminate treatment when even the mildest occur.

In the prevention of reactions, Dr. Somerford went on, the type of gold salt used or its method of administration seems of little importance. Calcium gluconate, glucose, and whole-liver extract given simultaneously with the gold therapy have been found to reduce the incidence of toxic symptoms. Repeated examination of the urine for signs of renal damage is most important. It has been suggested that the gold acts as a catalyst and that equally good results may therefore be obtained with small as with larger doses. The results of gold treatment are encouraging but it must be remembered that serious symptoms and even death may result from injudicious dosage or lack of attention to mild symptoms of possibly toxic origin.

Dr. NORMAN KLETZ briefly reviewed the history of gold as a therapeutic agent in pulmonary tuberculosis and later in other conditions. It is interesting, he said, that its use in rheumatism was suggested by the analogy between the life-histories of tuberculosis and arthritis. While our knowledge of the pharmacological action of gold is limited, many of its toxic effects are well known. These may be divided into (*a*) specific gold reactions, such as general malaise, pyrexia, and local response in the brain; (*b*) local damage at the site of injection; and (*c*) effects on the digestive tract (anorexia, nausea, vomiting, diarrhœa, stomatitis), the skin (variable, localised, or general), the kidneys (albuminuria, sometimes nephritis), the blood (action on the bone-marrow producing aplastic anæmia, agranulocytosis, or thrombocytopenic purpura), the liver (hepatitis), and the nervous system (peripheral neuritis, mental symptoms, or epileptiform attacks).

Discussing the importance and non-assessability of idiosyncrasy, Dr. Kletz said that small dosage and short courses with a long interval between them minimised the dangers. When once toxic symptoms have developed, it is doubtful if any effective radical treatment is possible, and treatment can only be symptomatic.

Gold therapy is likely to be effective, he said, in primary or secondary rheumatoid arthritis and spondylitis ankylopoietica. It is ineffective in fibrositis and also in osteo-arthritis except when there is a superimposed infective factor. In 103 cases that Dr. Kletz reviewed toxic reactions were rare and on the whole not severe. There was one death from thrombopenia and spontaneous hæmorrhage, and one case of severe hepatitis which recovered. Assessment of results was difficult. In a considerable number of cases the improvement was almost miraculous, and in very few was there no material improvement. The general conclusion was that gold therapy is the most valuable weapon we have in the treatment of certain types of arthritis. It is, however, a dangerous weapon and only to be employed by those willing and able to control its use by adequate clinical and laboratory observations.

In the discussion emphasis was laid upon the importance of care in dosage, a careful watch for signs of intolerance, efficient control of the treatment—preferably in hospital with regular blood investigations—and the need for a full consideration of each patient's condition before beginning gold therapy.

THE LANCET 100 YEARS AGO

January 26, 1839, *p.* 672.

From a lecture by Michael Faraday at the Royal Institution on electric fish.

The electric power exhibited by these animals, Mr. Faraday said, was in the direct ratio of the nervous influence exerted by the animal. The electric action, like muscular action, was followed by exhaustion. It was after the exhaustion of the animal by repeated discharges that, in South America, the gymnotus was taken . . . As the fatigue wore off they gradually recovered their electric strength. "It is thus evident," quoth the lecturer, "that nervous power may be converted into electric power, as clearly as that electricity may produce heat. Why may not the converse of the experiment be true, and nervous influence be generated from electricity, as electricity, after producing heat, may again be reproduced from heat? . . . I have no doubt that this nervous power is as material as heat, light, or electricity, and is conducted along the nervous fibrils in the same manner as water, gas, or the electric fluid is carried through pipes or conducting wires."

REVIEWS AND NOTICES OF BOOKS

Physiology of the Nervous System

By J. F. FULTON, M.A., D.Phil. Oxfd, M.D. Harvard, Sterling professor of physiology, Yale University; formerly fellow of Magdalen College, Oxford. London: Humphrey Milford, Oxford University Press. 1938. Pp. 675. 25*s*.

Prof. Fulton has written a book which, to use his own words, is designed to bridge the gap between the concepts of neurophysiology and the problems of clinical neurology. He is well equipped for this task since he has been successively an assistant to Harvey Cushing, a member of the Oxford school of physiology, and professor of physiology at Yale University, and his own contributions to the experimental physiology of the nervous system are important.

A book such as this is likely to be either predominantly physiological or predominantly clinical. This is the former, and for this reason it will be of greater value to the advanced student of neurology, who if he is supplied with physiological facts can appreciate their clinical applications, than to the beginner. All the functions of the nervous system that are common to man and the experimental animal are described in relation to their anatomical basis, the only conspicuous omission being the humoral transmission of the nervous impulses at the myoneural junction. Prof. Fulton characteristically introduces each chapter with a valuable historical note, so that the book includes, almost as an aside, a history of neurophysiology. The exposition is everywhere clear and up to date and the book is well illustrated by diagrams. There is a full bibliography containing over 1300 references, and the production and type are excellent. The book fills a real need and will be welcomed as much, if not more, by neurologists and physiologists as by students.

Practical Pathology

Including Morbid Anatomy and Post-mortem Technique. (3rd ed.) By JAMES MILLER, M.D., D.Sc., F.R.C.P.E., professor of pathology, Queen University, Canada; and JAMES DAVIDSON, M.B., F.R.C.P.E., director of the Metropolitan Police Laboratory, London. London: A. and C. Black. 1938. Pp. 518. 25*s*.

THE first and second editions of Prof. Miller's book were handy little volumes, admirable in connexion with museum study, and cost about half a guinea; the third, in which Dr. Davidson has collaborated, is much larger and costs almost as much as a standard textbook of pathology, but the preface states that it "in no way attempts to supplant the larger textbooks." Longer than is usual for a book of pure morbid anatomy it lacks the theoretical approach of a textbook. Moreover being arranged under organs and not diseases it does not serve the purpose of describing post-mortem appearances. There are also signs that the revision has not been quite thorough. The old classification of nephritis is adhered to, ending with a chronic interstitial variety. Hæmochromatosis and scurvy are included with the diseases of the blood, and there is no mention of fat necrosis of the breast, pulmonary fat embolism as a cause of death following injuries, or of the characteristic bilateral softening of the caudate nucleus found in delayed carbon-monoxide poisoning. The section on the medicolegal autopsy, however, is excellent, particularly the part dealing with the examination of the fœtus and newborn child. Standard histological methods are soundly described in an appendix, though there are trifling inaccuracies.

Both authors and publishers must be congratulated on the fine half-tone illustrations, and the colour photographs of specimens are some of the best yet published.

Yearbook of General Medicine

Infectious diseases, edited by GEORGE F. DICK, M.D. *Diseases of the chest*, by J. BURNS AMBERSON, Jun., M.D. *Diseases of the blood, blood-forming organs, and kidney*, by GEORGE R. MINOT, M.D., and WILLIAM B. CASTLE, M.D. *Diseases of the heart and blood-vessels*, by WILLIAM D. STROUD, M.D. *Diseases of the digestive system and of metabolism*, by GEORGE B. EUSTERMAN, M.D. Chicago: The Yearbook Publishers; London: H. K. Lewis and Co. 1938. Pp. 340. 12*s*. 6*d*.

THE yearbook series is probably less well known in England than it deserves to be. The Yearbook of Medicine, which is under particularly distinguished editorship, is uniform in style and standard with its predecessors. It is of handy size, and contains abstracts of the most significant papers of the year with the briefest of editorial comment. The abstracts are unusually long and full and many of them are illustrated, so that they give a very fair impression of the papers they represent. Those who wish to keep abreast with advances in medical thought with the minimum outlay of trouble will find the book well worth their attention.

Major Endocrine Disorders

By S. LEVY SIMPSON, M.D. Camb., M.R.C.P., physician to Willesden General Hospital; assistant physician, Princess Louise Kensington Hospital for Children; consulting physician to the Soho Hospital for Women. London: John Bale Medical Publications. 1938. Pp. 184. 10*s*. 6*d*.

THE aim of this small volume is to supply physicians and examinees with the essentials of the clinical features and treatment of certain of the major endocrine syndromes. Some of the material has already appeared in medical journals and is based on lectures which the author has delivered.

Emphasis is laid on the polyglandular nature of endocrine disorders. Dr. Levy Simpson rightly points out that the clinical manifestation of each syndrome is usually incomplete, but his argument that the lack of some characteristic sign or symptom need not therefore lead to diffidence in diagnosis may strengthen the dangerous temptation to make an endocrine diagnosis on too slender grounds. The photographs which illustrate the book are excellent, and have obviously been chosen with considerable care. They have too the great merit of originality. In works on this subject there is often a tendency to borrow illustrations from existing publications, so that the features of one or two sufferers come to be regarded as the prototype of some particular syndrome, and students and practitioners refuse to accept a diagnosis unless the patient resembles the classical illustration. A short discussion of menstrual disturbances has been included by request. Perhaps, for a book of this nature, undue prominence is given to climacteric disorders, and interesting as it may be to trace the likeness of Cushing's syndrome to certain menopausal manifestations this has the effect of magnifying the grossness of menopausal signs and symptoms, which are usually relatively trivial.

While Dr. Levy Simpson's book is a valuable contribution to the literature of clinical endocrinology, it should be clearly understood that he has not attempted to write a standard textbook. The work will be of particular interest to the general physician who comes in contact with a fair number of cases of endocrine disorder, and whose interest in the subject has thus already been stimulated.

A Manual of Reparative Plastic Surgery

By J. EASTMAN SHEEHAN, M.D., F.A.C.S., professor of plastic surgery, New York Polyclinic medical school and hospital. London: Humphrey Milford, Oxford University Press. 1938. Pp. 311. 30*s*.

IN this beautifully produced book the author offers "an up-to-date statement of the service to be had from the tissues of the body." Part 1 is confined to general principles and gives an indication of the merits of each type of repair, while part 2 shows how the basic principles of repair are applied to different parts of the body. Dr. Sheehan speaks with great authority on this branch of surgery and his book gives a clear idea of its scope. In this country a great part of the section dealing with operations on the cornea, the eye muscles, and the nasolacrimal system would be considered as entirely in the province of the ophthalmologist. Some of the phraseology is rather stilted, for instance, tears are "the fluid emanation of the lachrymal gland" and an artificial eye a "simulated eyeball." A few loose statements have also been allowed to pass. In dealing with cleft palates we are instructed to continue the dissection "upward to the base of the brain" and later "to separate the (palatal) bone from the adjoining maxillary process," after the hamulus has been broken off "to release the tendons of the palate." It is a pity that such blemishes have been allowed to mar a book that otherwise throws much light on an admittedly difficult subject.

Treatment of Fractures

(11th ed.) By CHARLES LOCKE SCUDDER, A.B., Ph.B., F.A.C.S., consulting surgeon to Massachusetts General Hospital. London: W. B. Saunders Co. 1938. Pp. 1208. 55*s*.

Dr. Scudder's well-known book has been entirely rewritten, and has been enriched by many chapters on special fracture problems by surgeons who speak with authority. The book is based on the views and teaching of the fracture service of the Massachusetts General Hospital and as would be expected is eminently practical. Obsolete methods have been omitted, and for each fracture the treatment which the author has found most satisfactory is described in detail, while alternatives are only briefly mentioned. The result is a pleasantly readable book, but such selection has certain disadvantages. For example, in dealing with fractures of the neck of the femur the author advises the use of steel internal fixation when possible, but the only method described is that of Moore by the multiple nail method, although this is stated to have been in use no more than three years. Again, in the chapter on open or compound fractures, the Carrel-Dakin treatment is described at length but no mention is made of the principles or technique of the Winnett Orr method. At the end of this chapter there is a casual statement that should be deleted in future editions: "the accurate open reduction and plating of a compound fracture in addition to the use of the Carrel-Dakin method . . . tends towards rapid union without infection." Those with memories of the late war will recall the many disasters which followed a similar line of thought and action. The chapters on pathological fractures by Dr. T. W. Harmer and Dr. C. F. Geschickter, and on fractures of the facial bones by Dr. Kazanjian and Dr. Thoma, are beautifully illustrated and written with the distinction that we should expect from authors of their experience.

The illustrations throughout are plentiful, apposite, and finely reproduced. Taken as a whole this book is as exhaustive and detailed an account of fractures as could be wanted.

Alcohol and Human Life

(2nd ed.) By COURTENAY C. WEEKS, M.R.C.S. London: H. K. Lewis and Co. 1938. Pp. 454. 6*s*.

THIS is partly a revision of "Alcohol and the Human Body" (Horsley and Sturge), published many years ago. In the main it is a detailed compendium of the effects of alcohol upon the physiological processes of the body. Chapters however are also devoted to the relation of alcohol to road traffic, its effect on national life, its consideration as a racial poison, its influence on the duration of life, and narcotics and narcosis. While the data may be accepted as valid the author's deductions from them are often debatable. The psychological aspect is hardly touched upon and alcohol is wrongly stated to be an aphrodisiac. The book may be useful for reference.

Evolution of Obstetric Analgesia

By ANDREW M. CLAYE, M.D. Leeds, F.R.C.S., F.R.C.O.G., professor of obstetrics and gynæcology, University of Leeds; with a chapter by W. STANLEY SYKES, M.B. Camb., D.A., hon. anæsthetist to the General Infirmary, Leeds. London: Humphrey Milford, Oxford University Press. 1939. Pp. 103. 6*s*.

THE author states in his preface that his book is chiefly designed to fill the gap left in works on obstetric analgesia by their omission of any account of the history of the process. Actually he has done more than fill this gap, for his excellently written little book also gives a first-rate description of the method which most appeals to him—namely, twilight sleep. In its true form this method demands the constant presence of the obstetrician and that has long been recognised as its great drawback from the general practitioner's point of view. Dr. Claye is fully aware of this and states clearly that "on the whole, methods of twilight sleep are unsuitable for the conditions of general practice." How very satisfactory they can be when properly conducted in an institution many records in these pages show. The author's own preference is for a twilight sleep brought about and maintained by the combined use of Pernocton and scopolamine.

Dr. Claye regards the barbiturates generally as of great value in obstetric practice and approves the Nembutal and chloral hydrate combination recommended by J. V. O'Sullivan and W. W. Cramer (*Lancet*, 1932, **1**, 119). His method with pernocton is to inject usually from 4 to 5 c.cm. into a vein at the bend of the elbow. The injection is made slowly—i.e., at the rate of 1 c.cm. in two minutes. As soon as the patient is asleep the needle is withdrawn and the dose noted. Immediately afterwards a small dose of scopolamine is given hypodermically. This first dose of scopolamine is gr. 4/1000 or 5/1000. Half an hour later gr. 2/1000 or 3/1000 is given unless the

patient appears wakeful sooner. A memory test is carried out after the second dose. Approximately hourly doses of gr. 1/1000 to 5/1000 are required but of course there is much individual variation. Some restlessness is usual and in some cases the efficiency of the second stage pains is certainly impaired. Chloroform in minimum doses has been given towards the end of the second stage in most of the cases to check restlessness. After delivery the patient usually sleeps for several hours.

Dr. Sykes's chapter gives a brief account of recent developments in obstetric analgesia by inhalation, such as Minnitt's gas-and-air analgesia, without attempting any detailed description of how to employ the methods enumerated. The whole book is written with care and judgment, and it can be cordially recommended to all interested in the subject.

British Journal of Surgery

THE January number of this journal contains the following articles:—

EVOLUTION AND DEVELOPMENT OF SURGICAL INSTRUMENTS. By C. J. S. Thompson (R.C.S. Eng.). This, the sixth article in the series, contains illustrated descriptions of headsaws dating from the twelfth to the early nineteenth centuries, and also of Ambroise Paré's cutting compasses and of an early form of trephine.

RELATION OF LYMPHATIC VESSELS TO THE SPREAD OF CANCER. By J. H. Gray (London). Intradermal injection of Thorotrast has been used to demonstrate the course and patency of the skin lymphatics, and evidence has been obtained in favour of embolic lymphatic spread of cancer and against permeation.

INTRAPELVIC CYSTS, PROBABLY OF MESONEPHRIC ORIGIN. By A. R. H. Oakley (London). A case is described in which two pelvic cysts were discovered at operation in a man whose symptoms suggested an acute abdomen. The ætiology is discussed and some recent cases analysed.

EPIDERMOIDS ARISING IN THE DIPLOË OF THE BONES OF THE SKULL. By G. F. Rowbotham (Manchester). Two cases successfully treated by operative removal are described. Comment is made on the danger of the tumour from perforation of the inner table of the skull, and on its possible origin from failure of ectodermal cells to undergo neurogenic differentiation.

OBTURATOR HERNIA: ITS ÆTIOLOGY, INCIDENCE, AND TREATMENT, WITH TWO PERSONAL CASES. By Cecil P. G. Wakeley (London). The anatomical relations of obturator hernia are fully demonstrated by reference to museum specimens. The association of abdominal discomfort with pain down the thigh may allow preoperative diagnosis. Taxis is dangerous. The abdominal route is preferred for operation.

SIMPLE NON-SPECIFIC ULCER OF THE CÆCUM. By J. R. Cameron (Edinburgh). Although not perforated the ulcer in the case described gave rise to the symptoms of an acute abdomen. Resection was successful. The literature is summarised.

CARCINOMA OF THE JEJUNUM: ACUTE INTESTINAL OBSTRUCTION. By F. Mitchell Heggs (Sheffield). Three cases are described, two of which were treated by resection and one by low gastrojejunostomy. The treatment of high intestinal obstruction in general is discussed.

TWO CASES OF SARCOMA OF THE SMALL INTESTINE WITH UNUSUAL FEATURES. By D. Lincoln Lewis (London). One case was a leiomyosarcoma and the other a lymphosarcoma. In the diagnosis stress is laid on the presence of a movable mass, with occult blood in the stools and hypochromic anæmia.

ADAMANTINOMA OF THE TIBIA. By R. Glyn Thomas (London). The growth, which was histologically quite typical, occurred in a girl of 19. It involved almost the whole tibial shaft, recurred after an extensive guttering operation, and eventually necessitated amputation.

NON-MALIGNANT STENOSIS OF THE ŒSOPHAGUS. By G. Grey Turner (London). From an unusually extensive experience of the condition the author is convinced of the great value of repeated gentle and gradual dilatation by bougies. Clinical accounts are given of various types of case and their management is critically reviewed.

HYPERTELORISM: NOTES ON THREE CASES. By H. P. Pickerill (Wellington, N.Z.). The nasal bones are massively developed, with excessive width between the orbits, while the point of the nose is small and retracted. The appearance can be greatly improved by lengthening the columella combined with cartilaginous grafting to raise the bridge of the nose.

THE HYPEROSTOSES IN RELATION WITH THE MENINGIOMAS. By G. F. Rowbotham (Manchester). On a review of 100 cases of meningioma, 23 of which developed hyperostoses, the author bases a description of three clinical types. He concludes that there is no intimate relationship between the variety of the hyperostosis and the cell type of the meningioma. He regards the veins as the main route of spread.

A LEAKING NON-SPECIFIC ANEURYSM OF THE COMMON ILIAC ARTERY, WITH EFFECTIVE TREATMENT BY WIRING. By W. Carleton Whiteside (Edmonton, Alberta). The symptoms were very severe pain and a pulsating swelling in the left iliac fossa.

VOLVULUS OF THE STOMACH ENDING IN PERFORATION. By K. C. Gharpure (Poona, India). A girl aged 8 years suffered from nausea, vomiting, and left hypochondriac pain for three days. Operation on the third day revealed generalised peritonitis. She died four hours after operation.

VOLVULUS OF THE STOMACH ASSOCIATED WITH A RARE FORM OF DIAPHRAGMATIC HERNIA. By W. C. Osman Hill and Milroy Paul (Ceylon). The condition had given rise to symptoms of chronic pyloric obstruction in a child aged 14 months. Laparotomy proved fatal. The stomach was rotated on its long axis and there was a parœsophageal hernial sac.

There are also three notes on rare cases.

British Journal of Children's Diseases

To the current issue (October–December, 1938) Mr. C. P. G. Wakeley and Dr. F. R. B. Atkinson contribute a paper on acute intussusception in children based on 121 cases which Mr. Wakeley had had under his care at King's College Hospital, London, and the Belgrave Hospital for Children during the years 1920–29. Of these, 83 (70 per cent.) were males and 38 (30 per cent.) females. The large majority (72) were under the age of one year, the youngest being a female baby of three weeks and the oldest a boy of eight years. The types of intussusception were as follows: ileocæcal 67 cases, ileocolic 41, enteric 6, enteric and ileocæcal 5, enteric and ileocolic 2. The four commonest symptoms were abdominal pain of sudden onset and great intensity, vomiting, and later the presence of blood and mucus in the discharges and of an abdominal tumour. There were 12 deaths (10 per cent.).—In a paper on the causation of paralysis in diphtheria Dr. Ian Taylor states that during the first four or five weeks of an attack of diphtheria the paralyses are of the local type and that after a course of variable duration further and more serious paralyses develop in a comparatively rapid sequence. Dr. Taylor therefore suggests that pharyngeal and respiratory paralyses may be caused by a combination of the action of circulating toxin and local spread, neither of which acting singly could have caused sufficient damage to give rise to loss of function.—Dr. J. Shafar contributes a paper on chorea and athetosis in childhood, in which he draws attention to the points of resemblance between the two conditions and discusses their ætiology.—In the concluding part of his article on exophthalmic goitre in children Dr. F. R. B. Atkinson gives in tabular form the details of 208 cases of Graves's disease in children under fifteen years of age published between 1851 and 1937.

The abstracts from current literature are devoted to nervous and mental diseases.

THE LANCET

LONDON: SATURDAY, JANUARY 28, 1939

BETWEEN FRIENDS

THIRTY-TWO years ago a large number of English medical societies were fused in a new federal body, the Royal Society of Medicine. We had advocated this fusion for the sake of efficiency—because, like the promoters of federation, we believed that greater efficiency would increase the service rendered to the profession. That belief has been justified; but as the society has grown stronger for good it has also grown more intent upon its own interests. So far as we are concerned, the change began some years ago when we received notice that the society holds the copyright of all papers and addresses read before it and that these cannot appear elsewhere without leave from the editor of the *Proceedings*. The presumed object of this not unreasonable veto was to enhance the standing of the *Proceedings* both inside and outside the fellowship; and this we must believe is also the underlying purpose of the restrictions since placed on our publishing reports of the meetings of the various sections. Before reporting any meeting we must now ask permission; and such permission is being more and more often withheld —because the council of the section has decided not to admit reporters during the present month; because the section always prefers to meet in private; or because a particular meeting (sometimes on an everyday clinical subject) is being held in camera.

As journalists we hold strongly that the early and widespread dissemination of medical opinion is an important factor in medical progress and that such dissemination is desirable even at the cost of an occasional inaccuracy. We are prepared to collaborate in any arrangements that will prevent error while permitting expeditious and effective reporting, but we are not prepared to concur in a policy of exclusion. We recognise that private discussion is valuable and that various societies, clubs, and associations have been formed for this purpose; indeed one of the societies that joined the federal body, the Pathological Society of London, decided from the outset that its habit of private colloquy should be maintained. But in general the Royal Society of Medicine was designed otherwise: like nearly all its constituent units it was meant to be a forum for discussion of current opinion and practice—a place where novel views, orthodox views, and unorthodox views could be subjected to clarifying comment. Do those taking part in its debates really want to speak to a restricted audience and to have their remarks recorded only weeks or months later and solely for the benefit of fellows of the society? Will not this lack of publicity ultimately affect the prestige of the society and the attendance of its meetings? Will not silence prove disadvantageous to those younger men whose critical contributions to discussions gradually earn them recognition and authority? To these domestic questions we add another, more universal: Cannot the profession as a whole share the advantages that efficient organisation has brought? We believe that actually fellows of the Royal Society of Medicine will be the last to wish that their fruitful union should give birth to any kind of monopoly; they will want their experience and opinions made as useful as possible to practitioners and scientific workers elsewhere. Nevertheless the developing programme of their organisation seems to be leading them, by almost imperceptible degrees, away from this idea of general service.

We ask the sections and their officers to recall that when they refuse access to the reporters of the *British Medical Journal* and the *Lancet* they are not merely (as it may seem) refusing access to a reporter and an editor; they are refusing it to the thousands of medical men and women throughout the world who read the weekly journals but do not, and will never, see the society's own report. Such a decision, surely, should not be taken lightly; and if it is taken mainly to increase the value of the *Proceedings* we ask them to think not twice but three times. Boiled down to its essentials the argument would run: fellows of the society are entitled to the reports because they have paid for them; other people are not entitled to this privilege. This is an argument that the *Lancet* fought with success last century: we declared that the teaching given in the medical schools was the property of the whole profession and not merely of the students who paid the teacher. No doubt we were legally wrong; but we were professionally and traditionally right. And we are glad to know that our colleagues of the *British Medical Journal*, inheritors of the same tradition, are, like us, unwilling to surrender a right of access that our predecessors dearly won.

HOW THE VIRUS OF POLIOMYELITIS SPREADS

THE prevalence of poliomyelitis in this country during the latter part of last year has led many people to inquire how the disease is spread. In outbreaks, such as that at Eelstead, the question arises which is more important: contact and droplet infection, or infection by food contaminated with the virus, either by excretal pollution or in some other way. What do we actually know about the presence of the virus in the nasopharynx or in the intestinal tract of persons suffering from the disease, whether in its acute stage or during convalescence? KRAMER, HOSKWITH, and GROSSMAN review[1] the evidence and record a series of recent observations made by themselves in New York. The results recorded by earlier workers are presented in a series of synoptic tables;

[1] Kramer, S. D., Hoskwith, B., and Grossman, L. H., *J. exp. Med.* 1939, **69**, 49.

but the reader is warned that many of the earlier findings should be regarded with caution, and that full confidence should be accorded only to those instances in which the occurrence of the disease in the first monkey inoculated with any sample under test has been confirmed by the successful passage of the virus to further monkeys. Accepting this criterion, the records show that the virus has been demonstrated in nasopharyngeal washings obtained post mortem from persons dying from the disease, and during life from acute cases, convalescent cases, abortive cases, contacts, and carriers. It has also been demonstrated in the fæces during the acute stage of the disease, and during convalescence. The total number of successful isolations has, however, been small; they afford no basis for any estimate of the frequency with which the virus may be recovered from the nasopharynx or from the fæces at different stages of infection. It is, indeed, unlikely that we shall be in a position to evaluate carrier-rates for the virus of poliomyelitis until we have at our disposal some method of isolation less expensive, and less time-consuming, than the reproduction of the disease in monkeys followed by successful passage.

These American observers took nasal washings and fæces from twenty patients at various stages of the disease or during convalescence. The fæcal specimens were freed from living bacteria before inoculation into monkeys by treatment with ether. Virus was only recorded as present when passage experiments were successful. From these twenty patients four strains of virus were isolated. One was from the nasopharyngeal washings of a child aged six years 5 days after the onset of the disease. In this case the fæces were negative. A second was from the fæces of a child of fourteen 7 days after the onset of the disease. In this case the nasopharyngeal washings were negative. The third and fourth strains were from the nasopharyngeal washings and fæces of a child aged two years, both samples being taken on the 9th day after onset. We may, then, take it as proved that the virus of poliomyelitis can be recovered from the fæces as well as from nasopharyngeal washings, though we cannot yet estimate its relative frequency in the two situations. This demonstration, as KRAMER and his colleagues are careful to emphasise, tells us little beyond the fact that the virus is able to withstand the acidity of the gastric juice and pass alive into the intestine. It does not justify the assumption that primary infection occurs via the gastro-intestinal tract, since nasopharyngeal infection might well be followed by passage of the virus to the intestine by reflex swallowing. It does not, indeed, tell strongly either for or against the view that infection may sometimes be carried by contaminated foodstuffs instead of by droplet infection, since certain kinds of food, and particularly unpasteurised milk and uncooked fruits and vegetables, may be contaminated from the nasopharynx as readily as from the fæces. Most workers would, we think, agree with KRAMER that no evidence has yet arisen to throw doubt on the generally accepted view that the most important method of spread in poliomyelitis is by human contact, and particularly by droplet infection. This does not mean that we can neglect the possibility of spread by contaminated food. Its occasional occurrence seems no more unlikely than milk-borne outbreaks of tonsillitis.

The lesson that we should learn from the isolation of the virus from the fæces is a rather different one. It is clear, even if we accept the view that infection almost always occurs by the nasopharyngeal route, that we should pay more attention to the treatment and disposal of excreta from infected persons. Dry fæces may well produce highly infective dust particles; inadequate sewage disposal may lead at times to the contamination of food or water, which may then infect the nasopharynx on its way to the stomach.

MANCHESTER'S HOSPITAL CENTRE

THE opening by the Minister of Health of the new orthopædic and physiotherapeutic block at the Manchester Royal Infirmary on Jan. 20 has a two-fold significance. In the first place the new building provides modern facilities and amenities for the large organised fracture service established by the hospital some years ago. Equally important however is the leading rôle which this service in its new accommodation is expected to play in the coördinated scheme for the treatment of fractures covering the city of Manchester. This development is the work of the Joint Hospitals Advisory Board. The activities of this board are now well known, and the success with which it has brought the municipal and voluntary hospitals and the medical school of the university into equal partnership has earned widespread approval. The idea of a coördinated fracture service is part of what one day may be a true unification of existing orthopædic services. The scheme which is now in being provides for the free interchange of patients between the various fracture units of a city with over three-quarters of a million inhabitants, and where not less than 6000 new fractures have to be dealt with each year. It should be possible in the future to segregate certain types of injury in one unit for special study, and with a uniform system of documentation knowledge should be readily available regarding the end-results of any particular form of fracture treatment.

Manchester is rapidly moving towards the creation of a university hospitals centre, without the need for transferring the teaching hospitals to a new site far from the heart of the city and without taking from any of them their individuality or traditions. The relatively modern buildings of the Royal Infirmary now cover 17½ acres, and this hospital is flanked by the Royal Eye Hospital on one side and by the St. Mary's Hospitals for Women and Children on the other. Nearby are the university departments of pathology and bacteriology, which have been established for some time, and the university department of experimental surgery which was opened last year. Although there has been no amalgamation between

the Royal Infirmary and St. Mary's there is to be the closest coöperation between them so that their activities will not overlap. St. Mary's will deal with all gynæcological cases, whereas the Royal Infirmary will place at the disposal of St. Mary's its radiological and other technical departments. The medical staff of one hospital will be available for consultation by the other and the nurses of both will be under the charge of a joint nursing committee. To cope with its added responsibilities St. Mary's proposes to close its obstetrical branch in the centre of the city, and to build a new obstetrical hospital with 160 beds in High Street, adjoining the gynæcological branch. As the first step it has erected an admirably equipped out-patient building for gynæcology and pædiatrics which has been in occupation for several months and has now received the official blessing of the Minister of Health.

TUBERCULOSIS IN INDIA

THE prevalence of tuberculosis in India cannot yet be computed in figures. Since the publication of LANKESTER'S textbook in 1920 there have been several surveys of districts and of groups such as the police, but none of them gives any real indication of the total number affected. In a special number (September, 1938) of the *Indian Medical Gazette* Dr. P. V. BENJAMIN of the Union Mission Tuberculosis Sanatorium records a survey carried out in 1927 in parts of the Chittoor district and its environs, which included three towns and two large and many small villages. The percentage of positive reactors in the whole group investigated was 37·8 for adults and 10·8 for children under fifteen. The survey showed that whilst the proportion of reactors was much the same in Hindus and Indian Christians it was strikingly higher in Moslems, whether urban or rural. In adults the percentage of positive reactors was 36·6 for Hindus, 32·4 for Indian Christians, and 53·4 for Moslems; in children, 9·9 for Hindus, 10·6 for Indian Christians, and 16·7 for Moslems. Dr. ROSE A. RISTE is persuaded that the key to the tuberculosis problem lies in the zenana. She points out that of the 600,000 deaths each year from tuberculosis all but 10,000 occur in the home, and she quotes figures for Ludhiana in the Punjab which show that the mortality among women of the 20–24 age-group is 83 per 100,000 of the total female population—more than four times the mortality in the same age-group in Detroit.

Analysing the occupations, Dr. BENJAMIN found a high proportion of reactors among the immediate attendants of tuberculous patients and in police, merchants, clerks, and others with indoor occupations, whilst the lowest proportion was in adults engaged in agriculture. A detailed study of the types of tuberculosis in patients admitted to the Union Mission Sanatorium since 1930, based on clinical, radiological, and blood examinations, showed that only 5·3 per cent. had obvious evidence of fibrosis, whilst in 93 per cent. the disease was predominantly of the exudative type, generally with little tendency to heal. As in the analogous case of the African native, Dr. BENJAMIN thinks that when tuberculosis arises in people living in their natural surroundings it does not tend to become epidemic but spreads slowly with a large number of mild and chronic forms. When living conditions change, however, many succumb to the acute form of disease. The environment in India is changing rapidly. Improved communications are bringing the villages into contact with the towns and industrial centres, and the amenities of urban civilisation are proving an increasing attraction for the rural population, so that there are more and more opportunities for concentrated infection.

This is another example of the evils that follow western industrialisation where there are no western safeguards, for antituberculosis measures in India are as yet in their infancy. Dr. C. FRIMODT-MÖLLER considers that India stands now where Europe stood thirty years ago, and he urges the need for the further development of tuberculosis clinics—the foundation of all preventive work—and of hospitals, sanatoria, educational and training schemes, and research. The chief obstacle to progress is the general poverty of the country, but the shortage of specially trained workers and the absence of health-insurance schemes and of any system of notification are contributory factors.

NATIONAL SERVICE

THIS week every household in the land will be receiving a guide to the ways in which the people of this country may give service. It contains a request from the Prime Minister to every citizen to read it carefully and to decide how he can best help. Apart from information for candidates for military commissions medical practitioners are not mentioned otherwise than to state that special arrangements are being made in conjunction with the British Medical Association to register those who are willing to volunteer for the various medical services that would operate in war-time. From the list of "reserved occupations," however, it is seen that no member of the medical profession, and no medical student who has passed the second professional examination, will be expected to undertake non-medical work. This also applies to bacteriologists and pathologists (other than members of the medical profession) who are more than 25 years of age.

The guide also has something to say about the great demand for nurses in view of the probable casualties among civilians as well as in the armed forces. It is essential, in the Government's view, that those who already have nursing experience should reserve themselves for nursing in time of war and that many women without this experience should train for such service. For their training they are referred to the St. John Ambulance Brigade, the British Red Cross Society, or St. Andrew's Ambulance Corps. Women who undertake to do nursing or first-aid work in war-time may offer to serve anywhere in the United Kingdom, or abroad if necessary, or they may make it clear that they would be unable to leave their home district.

ANNOTATIONS

GLASGOW TO PRINTING HOUSE SQUARE

THE reminiscence writer nowadays so often hopes to gain his effect by unveiling the clay feet of the great that it is easy to forgive one whose failings are all the other way. Dr. McNair Wilson's capacity for hero-worship may sometimes have led him astray in his "Doctor's Progress" (London: Eyre and Spottiswoode. 1938. Pp. 286. 10*s.* 6*d.*), but at least he is no debunker. Wilson was brought up in the strict but kindly home of a Glasgow merchant of the Free Kirk, with his Uncle Aday, who loved jokes and wore no socks, to offset his aunts whose chastity extended to allowing their cat out only on a lead. The Glasgow of fifty years ago went in perpetual fear of death, disease, and poverty, for its religion was based on hell-fire, its slums were the worst in Europe, and for the rich a crash on the exchange spelt social banishment. Darwin found ready acceptance there, for the survival of the fittest was the only law they knew. Like many others Wilson reacted from hell-fire to an atheism founded on science and technology. On leaving hospital for general practice he passed through the familiar stage of despair at the futility of what he had been taught followed by growing satisfaction as he learnt to apply it. In 1913 he came to practise in London, but a chance article that attracted the attention of Northcliffe led him to Fleet Street. Northcliffe picked a winner, for Wilson was a born journalist: he could make celebrities talk shop and remember what they said, and he could raise at least a temporary enthusiasm for any subject, however inherently dull. For Northcliffe he hired tugs to carry news of the Irish civil war, reported the arrival of the B.E.F. at Boulogne, and scooped the battle of the Marne. Later he helped Mackenzie, who was teaching the world that the only criterion of a heart's capabilities is what it can do. He caught glimpses of Ross's fury, of Bruce's geniality, of D. H. Lawrence's earnestness, of the superhuman traditions of a Guards' mess, and, as a consulting cardiologist and medical correspondent of the *Times*, of much besides. Twice he stood for Parliament as a Liberal, and came to realise the remoteness of politics from reality and the power of the slogan as a barrier against inconvenient seekers after truth. In his last chapters Wilson delves further into the theoretical; but he is a writer of great experience, and whether he is discussing the mysteries of psycho-analysis, the deeper mysteries of money, or his own political and spiritual metamorphoses, he is never dull.

CONTROL OF HÆMORRHAGE IN JAUNDICE

IT has long been known that patients with jaundice are particularly liable to bleed both at operation and soon afterwards. Early last year Butt, Snell, and Osterberg [1] brought forward evidence confirming the previous findings of Dam and Glavind [2] that the administration of vitamin-K concentrates, together with human bile obtained from a fistula or with animal bile-salts, had an inhibitory effect on such bleeding. The only recognised defect in the coagulation mechanism in jaundice is a prolonged prothrombin-time, and medication with vitamin K and bile-salts was found not only to stop bleeding but also to shorten the prothrombin-time. The same workers now report further results.[3] As a source of vitamin K they used a concentrate of alfalfa, which is rich in this vitamin. In planning preoperative treatment they divide jaundiced patients into three groups: those who have a normal prothrombin-time; those who have an elevated prothrombin-time; and those who are actively bleeding. For the first group they recommend 2–6 gelatin capsules, each capsule containing 200 mg. of alfalfa concentrate, and 1–2 grammes of animal bile-salts by mouth daily. Almost any type of animal bile-salts can be used, and Desicol, sodium desoxycholate, Bilron, and Bilein have all proved satisfactory. In the two latter groups much larger doses of vitamin K may be necessary. When the patient is actually bleeding 2–4 grammes of a water-soluble bile-salt dissolved in 250–500 c.cm. of warm normal saline solution together with 1–2 grammes of alfalfa concentrate should be given slowly by duodenal tube. Butt and his colleagues say that in severe cases the bleeding sometimes stops long before the prothrombin-time has reached normal. Similar medication in hæmophilia, menorrhagia, metrorrhagia, and essential hæmaturia was without effect, either on bleeding or on an already normal clotting-time. Of 28 jaundiced patients who were treated with vitamin K and bile-salts before and after operation only 3 bled postoperatively and none seriously, so there were no deaths from hæmorrhage. This is in contrast to 14 patients who received no such treatment and of whom 9 bled after operation. Though treatment with alfalfa and bile-salts is still purely empirical, it seems to deserve further trial in jaundiced patients in whom surgical interference is essential.

"MEN OF MEDICINE"

A FILM with this title is to be generally released on Feb. 6, after being shown in London for a week at the Astoria and another at the New Gallery. It is No. 10 of the fourth year of the "March of Time" series and is a synopsis of medical practice in the United States. The leading part is played anonymously by a senior medical student, who is shown studying anatomy (mainly by copying diagrams), swearing the hippocratic oath on qualification, attending his first patient and pocketing his first fee, and saving a boy's life by making a spot diagnosis of gangrenous appendix on the strength of muscular rigidity over the right iliac fossa. So far there is nothing very exciting, except possibly for the uninitiated layman; but now the story gets cleverly linked up with the major medical problem of the day in the U.S.A.—the problem of socialised medicine. The audience is shown how a movement has been started to protest against the medical profession's gift of free services in hospitals and elsewhere to the tune of a million dollars daily. Side by side with this fact that thousands of patients are getting free medical attention is the fact that in the wilder parts of the country, especially among the negro population, there are large areas with no medical service whatever. After three years' survey Thomas Parran, surgeon-general of the U.S. public health service, declares that 500 new hospitals are needed, and that the medical services should be controlled by the government. This has led to a difference of opinion in the profession. Alternative schemes have been suggested. John Peters, of Yale, thinks that special

[1] Butt, H. R., Snell, A. M., and Osterberg, A. E., *Proc. Mayo Clin.* 1938, **13**, 74.
[2] Dam, H., and Glavind, J., *Lancet*, 1938, **1**, 720.
[3] Butt, Snell, and Osterberg, *Proc. Mayo Clin.* 1938, **13**, 753.

taxes should be imposed, the income derived therefrom to be used by the government to subsidise hospitals and to pay their medical staffs. Kingsley Roberts votes for a coöperative scheme among patients. Morris Fishbein, editor of the *Journal of the American Medical Association*, opposes any radical departure from the present professional practice; he is described as representing the largest body of practitioners. These four "men of medicine" are named and shown on the screen airing their views. Whatever may be the outcome of the controversy, it seems to us right and useful that the public should have authoritative information about the principal issues.

POPULATION RESEARCH

SINCE the war, and especially during the last decade, the study of population has been pursued in the United States with characteristic energy. These studies have been facilitated by generous financial support from such voluntary organisations as the Scripps Foundation for Research in Population Problems and the Milbank Memorial Fund, and have yielded a mass of valuable and unique information. The subject is far from being only of academic interest. For many purposes—e.g., the provision of school places, water and electricity supply, transport development, and pensions schemes—it is important to make reasonably accurate forecasts of population growth. The continuing decrease in the number of school-children in this country, for example, has falsified earlier notions of the number of school places likely to be required in the future. The planning boards of the states of the American Union have lately taken up population forecasting, and increasing interest is being shown in population questions throughout the country. Successful forecasting requires trustworthy methods of estimation, and in this field valuable work has been done by Dr. P. K. Whelpton and Dr. Warren Thompson of the Scripps Foundation. Allied to the problem of foretelling population is that of determining what should be regarded as the optimum population of a country or parts of a country, a subject that is beset with difficulties and therefore still remains largely a matter of speculation. Even if the question is regarded purely from the economic point of view, and the optimum population defined as that which will ensure the greatest amount of economic welfare per head, the task of formulating criteria for determining the optimum is one of great complexity.

In addition to the problems of quantity there are others relating to qualitative differences that urgently require solution. To what extent may the decline of fertility in most western countries during the last fifty years be attributed to the voluntary limitation of families or to other factors? Can the decline be correlated with differences of social, economic, or educational status, of intelligence, or of race, religion, or geographic conditions? How far can a fall in population be checked by reduction in mortality, and what measures are most likely to be effective in checking the fall? These are some of the problems that confront modern students of population.

In a recent book Dr. Whelpton,[1] who has been assistant director of the Scripps Foundation since 1924, indicates the directions in which and the methods by which further research may most profitably be prosecuted. He emphasises the need for overhauling American official population statistics, especially the census enumerations and tabulations and the registration of births and deaths, and points out that drastic revision of procedure is required if the 1940 census is to avoid the defects of its predecessors, particularly as regards the under-enumeration of children and misstatements of age, race, nativity, and occupation. He suggests that a useful method of checking census results would be to have "sample areas re-enumerated by a carefully selected and highly trained staff of workers, perhaps chosen in coöperation with research workers in various parts of the country." But official statistics, however carefully compiled and helpfully tabulated, cannot furnish all the data needed for the elucidation of population problems. There is need for supplementary ad-hoc investigations, and particularly for what Dr. Whelpton describes as "the intensive gathering of information from selected groups of people by specially trained interviewers." Dr. Whelpton concludes by defining three groups of problems on which further research is especially needed:

1. The motives—economic, biological, and social—that lead couples to want a given number of children and practise birth-control accordingly.

2. The comparison of the present distribution of population within the nation with the optimum distribution.

3. The changes which are taking place in the hereditary make-up of the population, including their direction, rate, and causes.

One impression left by perusal of this book is that the extent and variety of American population studies are in striking contrast to what has been done in this country since the death of Malthus. Though in the early years of the century distinguished work was done by Sir Arthur Newsholme and the late Dr. T. H. C. Stevenson, and in 1922 Prof. Carr-Saunders produced in his book "The Population Problem" a contribution of first-rate value, it was not until some five years ago, when Dr. R. R. Kuczynski began his work at the London School of Economics, that the subject began to receive the attention its importance demands.

MANAGEMENT OF GANGRENOUS LIMBS

A PRINCIPLE widely accepted in the management of gangrene of a limb is that the part should be kept warm. The reasons for this at first sight appear obvious. Warmth is a quality possessed by a normal and lacking in an ischæmic limb, and should surely be restored where it is wanting. Warmth will improve the circulation by dilating the blood-vessels, and by promoting evaporation will keep the surface of the limb dry, two extremely useful functions. It will also increase the metabolic rate of the tissues, thereby one would suppose putting them in a better position to resist infection and the progress of the gangrene. But warmth has disadvantages, practical and theoretical. The dangers of overheating an ischæmic limb are well recognised nowadays; spread of the gangrene or fresh lesions are easily produced thereby. The analgesia often present in such a limb or an assumed lack of resistance of the ischæmic tissues is the explanation usually offered for these effects. The benefits of increasing the metabolic rate of the tissues, too, may be fallacious, for this is only an advantage so long as the tissues can be supplied with the extra fuel to sustain the increase, and the blood-supply of a partly gangrenous limb is so small that it is unable to keep the whole limb alive, let alone

[1] Needed Population Research. By P. K. Whelpton. Prepared under the auspices of the Population Association of America. Lancaster, Pa.: The Science Press Printing Co. 1938. Pp. 196. $1.00.

sustain an increase of its metabolism. If the metabolic rate of the tissues is raised but sufficient fuel is not forthcoming, the tissues will die and fresh gangrene will result. These arguments are theoretical, but are supported by some interesting animal experiments by Allen [1] in America. He found that if a rabbit's limb was strangulated with a tourniquet and immersed in ice-water for as long as 52 hours it would still recover, whereas a limb strangulated at room temperature would survive for only about 15 hours. If the limb was artificially warmed to 38° or 39° C. it would be even more rapidly affected by the strangulation. Moreover, the general toxic effects after release of the tourniquet varied inversely with the temperature of the limb during strangulation. It is a pity that Allen's experiments were not more strictly controlled, but he has at least made out a good case for further investigation. Clinical tests should also be carried out. It may be that a radical change will have to be made in the management of the gangrenous limb; perhaps it should not be warmed, but cooled.

ITCHING

IRRITATION of the skin by slight burns, freezing, pinching, galvanism, or ultraviolet irradiation produces two kinds of itching, named by Bickford [2] "spontaneous itching" (at the point of irritation) and "itchy skin" (in an elliptical area surrounding the point of irritation and evoked by the stimulus of touch). There is a definite boundary between itchy and normal skin. Injections of a solution of histamine in normal saline showed after puncture a latent period of 20–30 sec. before spontaneous itching began. Itchy skin could usually be detected over a small area in the immediate vicinity of the puncture at the end of a minute, and during the next 10 minutes it extended to form an elliptical area whose long axis was always parallel to the cutaneous nerve-trunk of the same region. That this phenomenon was not due to the diffusion of histamine was proved by injecting histamine into an anæsthetised area, whereupon itchy skin did not develop until the local anæsthesia had passed off.

Experiments were made to determine the nervous pathway. Reflex action through the spinal cord was excluded by the type of cutaneous response in the presence of barriers of anæsthetised skin. Itchy skin developed at a normal rate on the proximal side of such a barrier but was delayed on the distal side until the anæsthesia had passed off. This proved that the nervous pathway was local, and the fact that itchy skin did not spread round the edges of the barrier suggests a plexiform arrangement of the local nerves rather than a freely anastomosing network. The sympathetic nervous system was excluded from the mechanism of itchy skin by experiments in patients who had undergone unilateral sympathectomy. It was also found that itchy skin could be abolished by a degree of asphyxia that did not affect spontaneous itching. This showed that the two sensations were carried by different nerves. The sensation of tickling is closely associated with that of itchy skin. In cases of sensory dissociation itchy skin is not detected in areas that have lost the sensation of tickling, even though the sensation of touch may be retained. Spontaneous itching is not felt where pain to pinprick is defective. Tickle sensation, spontaneous itching, and itchy skin are all conveyed in the anterolateral tract and disappear when it is divided. Itchy skin can be inhibited (the inhibition being of central origin and probably produced through pain nerves), as shown in "antipruritic" skin produced by painful stimuli.

[1] Allen, F. M., *Surg. Gynec. Obstet.* December, 1938, p. 746.
[2] Bickford, R. G., *Clin. Sci.* December, 1938, p. 377.

EFFORT SYNDROME

SPONTANEOUS hyperventilation is admittedly a not uncommon manifestation of excitement, anxiety, and emotion in unstable people. Since it was first described in 1922 numerous cases have been recorded, originating from a great variety of exciting stimuli—some of them bizarre. Almost always the presenting symptom has been tetany or hyperventilation, and there has been no doubt of the diagnosis. It is of course certain that many cases will have escaped recognition; but if Soley and Shock [1] are correct in supposing that "effort syndrome," which has been well known for a long time, is really nothing more or less than spontaneous hyperventilation, there will be little to be said for those who have made a study of effort syndrome. There are, however, one or two points about Soley and Shock's contention that deserve critical reflection. Effort syndrome attacks both sexes, whereas hyperventilation tetany is rarely met with in men. (The only case described by Soley and Shock was in a woman.) Furthermore, effort syndrome is not characterised by tetany, which is usually a feature of simple hyperventilation. No doubt these discrepancies will be investigated but meantime there does not seem to be enough evidence to discard the old terminology of effort syndrome (as Soley and Shock suggest) and to substitute an "anxiety state complicated by the hyperventilation syndrome."

NATIONAL NUTRITION POLICIES

Too little attention is paid to the non-political work of the League of Nations. The technical commission on nutrition, for example, has been trying to help governments all over the world to improve the physical state of their peoples, and its latest report [2] describes the policies that various governments have actually adopted. It will be seen that some countries have done a good deal and others very little, but it is encouraging to observe the thoroughness with which some nations at least are investigating their problems. The national nutrition committees working under the League not only give advice to their governments but sometimes make recommendations on their own initiative. In 1937, for instance, the Danish committee drafted a bill to compel the proper preparation of flour, and the Iraq committee has advised its government on measures for stimulating fisheries. In many countries measures have been taken to remedy deficiencies in the dietary of the poor, especially the lack of milk. In Latvia the coöperative dairies offer bonuses to milk-producers, and in Norway grants are made for the provision of cheap milk, meat, and bacon to poor families. Many countries provide meals free or cheaply to special groups of consumers. Diet schedules have been drawn up and supervised by national nutrition committees on behalf of public institutions in which food is provided by the authorities.

The League recognises, however, that ultimately the obstacles to sound nutrition are largely economic, and that measures of public assistance scarcely touch the edge of them. Other measures adopted by different countries are the reorganisation of agri-

[1] Soley, M. H., and Shock, N. W., *Amer. J. med. Sci.* December, 1938, p. 840.
[2] Survey of National Nutrition Policies. League of Nations. 1937–38. Allen and Unwin. Pp. 120. 2*s.* 6*d.*

cultural production (as in Hungary and France), sympathetic tariff or transport policy, and better distribution. The Esthonian government have reduced the duties on fresh fruit, and the government of India the duty on dried skim-milk. The Latvian ministry of agriculture has organised the state transport of fish to inland settlers, and the Queensland government charge no freight on fruit or vegetables going to outlying districts more than 200 miles away. In this country the Food Council has suggested measures for rationalising the retailing of milk. The Scandinavian countries and America have considered the merits of "internal dumping," or distributing milk and other foods at reduced prices in their own territory, as against spending large sums to enable foreign buyers to obtain cheap supplies of foodstuffs which their own populations badly need. Education and publicity have been found to accomplish much, and some countries, particularly Belgium, have made good progress in this direction. The Yugoslav government have opened numerous schools to teach peasants how to manage their households and their farms, take care of children, cook and prepare provisions for the winter. Hygiene talks are broadcast every week from Baghdad, but the difficulties of propaganda in an illiterate country are very great. The whole report brings home to the reader the great value of an energetic international body of this kind.

HYPERTONIC INTRAVENOUS SALINE

THAT the injection of strong salt solutions into a vein is not without danger is shown by Robertson and Barrett.[1] Although an injection of 30 per cent. sodium chloride may raise the blood-volume of cats to double what it was before, this effect is only transient and the original level is regained in half an hour. A less desirable result is hæmolysis of red cells, which the investigators found sufficient to interfere with the vital-red method of blood-volume estimation, a similar effect being obtained in man. Other sequels to the infusion include crenation of the red cells with consequent reduction of the red-cell volume, and later an increase in the red-cell volume through mobilisation of the cells from the depots. This increase could be prevented by previous evisceration of the cats and exclusion of the liver from the circulation. Robertson and Barrett's experiments provide a further demonstration of the great care necessary in reading the results of blood-volume estimations after intravenous infusions.

SOCIAL FACTORS IN DISEASE

No general practitioner needs to be told that a large proportion of organic diseases have their origin in the patient's environment, or that the degree of disability and suffering produced by an organic disease varies largely with the patient's social conditions. In hospital patients, however, these facts are liable to be lost sight of and Dr. G. Canby Robinson [2] of Johns Hopkins Hospital is doing a valuable service in setting them on a firmer basis. He has made an intimate personal study of the relation between clinical findings and social conditions in 145 patients of mixed nationality and sex, chosen more or less at random from the wards and outpatient departments. After complete physical investigation each patient was interviewed by Dr. Robinson himself and an attempt was made to divide the symptoms into those caused by organic disease and those of emotional or psychogenic origin. Either Dr. Robinson or the social worker who collaborated with him subsequently visited 111 of the 145 patients in their homes. In two-thirds of the total adverse social conditions were found to be directly related to the patient's illness, and in more than a third they were considered its main precipitating cause. It should perhaps be added that 45 patients were found to be suffering from psychoneuroses or symptoms that could not be explained on the basis of demonstrable disease. Dr. Robinson's study however is evidence that many of the symptoms even of organic disease can be traced back to emotional disturbances associated with home or other environmental difficulties, and he pleads for systematic study of this relation.

[1] Robertson, J. D., and Barrett, J. F., *Quart. J. exp. Physiol.* December, 1938, p. 405.
[2] Robinson, G. C., *Trans. Ass. Amer. Phys.* 1938, **53**, 102.

WAR SURGERY IN SPAIN

THE possibility of being called upon to treat air-raid casualties is compelling civilian doctors to pay increasing attention to military surgery, and this gives an added interest to the lessons of the Spanish civil war. At one time some 200 international doctors, and 500 nurses, &c., were attached to the government forces and on Jan. 17 four of the British contingent recounted their experiences at B.M.A. House. The first speaker, Dr. R. S. Saxton, dealt with blood-transfusion under field conditions. He strongly advocated the "ampoule under pressure" method, using stored citrated blood, as being the simplest and most rapid and the only one practicable where doctors are scarce. Dr. A. E. Tudor Hart discussed gunshot fractures. He stressed the highly infected nature of the wounds met with and urged the importance of early excision rather than reliance on antiseptics. In his experience the necessity for primary amputation was rare in the case of the upper limb but much commoner in the lower, where gas-gangrene was more likely to arise. Amputation was not required where there was damage to the bones alone, but where the femoral or popliteal vessels were also involved. Organisation was essential in the treatment of gunshot fractures, and since something like three-quarters of field casualties had injuries to the limbs there was considerable scope for "traumatological teams" with special training in fracture work.

Dr. C. C. Bradsworth had been medical officer of the British battalion of the international brigade. He gave a vivid account of the hardships endured by the troops and a modest but none the less definite impression of what a regimental doctor can do to lessen suffering and preserve morale. Finally, Dr. D. Jolly spoke of the organisation of field hospitals. Successful results, he said, depend largely on efficient classification of the wounded. Field hospitals should be placed so that they were reasonably safe from shell fire and air bombing and so that evacuation from the front line was easy and rapid and there was the least possible delay between the wounding and the surgical intervention—time and not distance being the main consideration. If operations were done in tents great care was required in obscuring all lights. Buildings in villages, convents, churches, and large houses were liable to air attack and were not suitable for operating centres; recently the surgeons in Spain had placed their theatres in underground shelters, natural caves, and railway tunnels. Hospital trains could also be run into tunnels and used as both theatres and hospitals. Although mobile surgical teams were invaluable, mobile operating theatres apart from those in trains were fantastic. As regards equipment

all time-saving devices were to be encouraged and for that reason multiple sets of instruments and two or three tables should be available for each surgeon.

The problems that these surgeons have been facing with the Spanish army are no doubt only a part of those which would arise among civilians. Air-raid wounds are more severe and more likely to be multiple than those due to shell, rifle, or machine-gun fire, and the difficulties of collection and evacuation that loom large in all schemes for dealing with civilian casualties are comparatively negligible in purely military surgery.

INTERSEXUALITY

INTERSEXUAL individuals are found in almost every group of mammals. The earliest detailed investigations of mammalian intersexuality were made on freemartins, the externally female twins of male calves. Freemartins have female external genitalia, but as a rule their gonads are of the male type, though they do not produce spermatozoa. In 1916 it was suggested in America by Lillie, and in Germany by Keller and Tandler, that freemartins are zygotic females which have been modified by hormone passing from their male twins through the united embryonic membranes. This suggestion has now been experimentally investigated and partially confirmed by Dantchakoff,[1] who showed that female guinea-pig embryos are transformed in a male direction if they are injected with testosterone propionate in utero. The modifications affect the external genitalia, as well as the development of the wolffian ducts, seminal vesicles, and prostates. The ovaries remain unchanged.

Similar observations have been made on rats and mice. Thus Greene, Burrill, and Ivy[2,3] succeeded in masculinising female rat embryos by injecting male hormone into the mother during gestation. The external genitalia changed to the male type and wolffian organs appeared, while the uterus, oviducts, and the upper part of the vagina persisted. The fact that only the upper vagina persisted suggested to these investigators that the lower part is derived from the urogenital sinus, which developed in a male direction under the influence of male hormone. Raynaud,[4] whose experiments were similar to those of Greene and his associates, found that when male hormone is injected into mice eight days before parturition the female offspring have accessory reproductive organs of both the male and the female type, together with ovaries and male external organs. Both the müllerian and wolffian organs continue to develop after birth, whether or not more male hormone is injected. If such intersexual mice (but born of mothers injected three or four days before parturition) are allowed to grow up, their sexual behaviour is found to be normal, though they are necessarily infertile since they have no vaginal openings. On the other hand, if these modified females are injected with testosterone propionate, their behaviour becomes typically masculine, which suggests that sexual behaviour in mice may be largely under hormonic control.

The reverse change—that is the experimental feminisation of male fœtuses—has been reported recently by Greene, Burrill, and Ivy,[5] who injected œstradiol dipropionate into pregnant rats on the 13th, 14th, or 15th day of pregnancy. The male offspring had reduced prostates, vasa deferentia, seminal vesicles and epididymes, and also vaginæ similar to those of newborn females. One possible interpretation of these experiments is that œstrogenic hormone has a morphogenetic effect comparable with that of androgenic hormone.

[1] Dantchakoff, V., *Bull. biol.* 1937, **71**, 269.
[2] Greene, R. R., and Ivy, A. C., *Science*, 1937, **86**, 200.
[3] Greene, Burrill, M. W., and Ivy, *Amer. J. Obstet. Gynec.* 1938, **36**, 1038.
[4] Raynaud, A., *Bull. biol.* 1938, **72**, 297.
[5] Greene, Burrill, and Ivy, *Science*, 1938, **88**, 130.

A conference summoned at B.M.A. House on Wednesday, Feb. 15, will be addressed by the Minister of Health who will outline his plans for utilising medical personnel in case of emergency.

The Minister of Health has given notice of regulations under the Census Act to come into operation forthwith. This will enable the compilers of the National Register to use the ordinary machinery of the census.

The Minister of Labour has appointed an advisory council to advise him on the utilisation in war-time of persons with scientific technical, professional, and higher administrative qualifications. Sir Walter Moberly is chairman of this committee and among its members are Dr. E. J. Butler, F.R.S., Mr. H. L. Eason, F.R.C.S., and Sir Edward Mellanby, F.R.C.P., F.R.S. The secretary of the council is Miss B. M. Power, who may be addressed at the national service department of the Ministry, Montagu House, S.W.1.

The Duke of Gloucester will be the principal guest at a dinner next Monday to be given by the Lord Mayor at the Mansion House in support of an appeal on behalf of St. Bartholomew's Hospital. It is proposed to raise £65,000 to provide a paying patients' block, a new nurses' home, and adequate buildings for the X-ray department and for in-patients of the special departments.

On Tuesday, Feb. 7, the Society for the Protection of Science and Learning will inaugurate a national appeal at a conversazione which the Royal Society is holding at Burlington House, Piccadilly, London, W.1, at 8.30 P.M. The president of the Royal Society and the president of the British Academy will receive the guests.

Croydon corporation has decided to take no disciplinary action against any officer or servant in connexion with the recent outbreak of typhoid. The corporation is also seeking power to pay compensation even in cases of hardship in which actions have not been brought, provided the issues are the same as in the test case. The corporation has reached an agreement with the Metropolitan Water Board to take over the whole of the supply of water to the borough.

". . . We have our personal likes and dislikes that make it hard for us to assess impartially the scientific contributions of our fellow workers. Often these emotional aberrations take the still more irrational form of liking or disliking large groups of people whom we don't know but about whom we imagine things. Who among us maintains a strictly scientific attitude towards what is called the race issue, either in the form that is acute in Germany or in the form that is acute in the United States? To be more offensively personal, is there any one so free from vanity that he can be strictly scientific about critical appraisals of his own work? And on a higher level, are not most of us conscious of an unreasoned predilection for certain types of scientific inquiry balanced by an equally unreasoned tendency to depreciate the value of other types?"—WESLEY C. MITCHELL, *Science*, Jan. 6, 1939, p. 4.

SPECIAL ARTICLES

CONSTRUCTION OF AN ABRIDGED LIFE TABLE

BY A. BRADFORD HILL, D.Sc. Lond., Ph.D.

AND

M. G. HYDER, M.B. Patna, D.P.H.

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A LIFE table is only another means of expressing the mortality experienced in a particular area over a particular period of time. For instance, the last English life tables [1] show that, if 1000 newborn male infants died as they passed through life at the mortality-rates current in England and Wales at different ages in 1930–32, then at ages 10, 50, and 80 there would be, roughly, 890, 748, and 162 survivors still living. At the mortality-rates existing in the same years in Greater London there would be 900, 762, and 164 male survivors at these ages. Again, at the same mortality-rates of England and Wales the average length of life of these 1000 male infants (the so-called "expectation of life") would be 58·74 years; at the rates of Greater London the corresponding figure would be 59·52. At the former rates those who survived to age 60 would on the average enjoy another 14·43 years of life; at the latter rates another 14·37 years.

These and other functions of the life table are clearly essential in much actuarial work—e.g., in life assurance, where the capital amount that can be paid at death must be largely determined by the number of annual premiums that will, on the average, be received. They are also of value to the worker in public health, as the above examples show, as useful and graphic expressions of differences between the mortality-rates in different places and at different epochs. The construction of a complete life table is, however, rather a heavy piece of work, and it also demands a knowledge of the population living at each single year of life and the deaths occurring in each year of age. For a particular administrative area—e.g., a county borough—this detailed information is invariably lacking, and we have only the observed mortality-rates within certain age-groups—e.g., at 0–1, 1–2, 2–5, 5–10, 10–15, &c.

METHODS OF CALCULATION

By methods of interpolation, graphical or algebraical, it is possible to assess from these the death-rates at single years of life, but the process is somewhat laborious. Various methods, however, have been devised by which the salient features of the life table may be speedily calculated directly from the observed death-rates in the different age-groups and, on the available evidence, with sufficient accuracy for the purposes of the public-health worker. One such method was put forward nearly twenty years ago by E. C. Snow.[2] Using the national life table for 1910–12, constructed by the complete process, and the death-rates from which it was derived, he determined a number of equations by which the required life-table values could be directly calculated from the observed death-rates—e.g., the death-rate at ages 10–15 being known, the probability of surviving from age 10 to age 15 could be found by means of the appropriate equation. To shorten the work still further Snow constructed tables from which, the death rate being known, the required probability of survival could be read off. With these probabilities of surviving from one age to another the survival column of the abridged life table (l_x) can be constructed in a few moments—e.g., the death-rate in London in 1891–1900 was 0·00294 per person at ages 15–20; according to Snow's table the probability of surviving from age 15 to age 20 is, then, 0·9856, or in other words of x survivors at age 15 98·56 per cent. would be alive at age 20.

In the full life table the average length of life lived under the observed mortality-rates—the expectation of life—is derived from the knowledge of the number of survivors at each year of age. In the abridged table the number of survivors is known only at wider intervals of age—e.g., at 15, 20, 25, 35—and Snow therefore provides a further series of equations (and tables) enabling the required durations of life lived in each interval (say from 15 to 20) to be derived from the already determined probabilities of surviving. The expectation of life at different ages ($\mathring{e}_x$) can, therefore, also be calculated rapidly. By these means Snow constructed a number of abridged life tables and showed that the values given by them agreed with those given in the life tables constructed from the same data by the full process to a degree of accuracy well within the limits that would be necessary for the public-health worker.

COMPARISON OF THE VALUES REACHED BY THE ABRIDGED LIFE-TABLE METHOD WITH THOSE GIVEN IN THE FULL LIFE-TABLE MORTALITY IN ENGLAND AND WALES IN 1930–32

Age (x)	Numbers surviving at each age (l_x)			Complete expectation of life in years ($\mathring{e}_x$)		
	English Life Table No. 10	Abridged life-table method	Percentage difference	English Life Table No. 10	Abridged life-table method	Absolute difference
	MALES					
0	100,000	100,000	—	58·74	58·64	−0·10
1	92,814	92,779	−0·04	62·25	62·18	−0·07
2	91,394	91,376	−0·02	62·21	62·13	−0·08
5	90,069	90,026	−0·05	60·11	60·04	−0·07
10	89,023	88,915	−0·12	55·79	55·76	−0·03
15	88,360	88,259	−0·11	51·19	51·15	−0·04
20	87,245	87,154	−0·10	46·81	46·77	−0·04
25	85,824	85,678	−0·17	42·54	42·53	−0·01
35	82,885	82,753	−0·16	33·87	33·85	−0·02
45	78,357	78,244	−0·14	25·51	25·49	−0·02
55	70,041	69,887	−0·22	17·89	17·89	0·00
65	54,899	54,944	+0·08	11·30	11·28	−0·02
75	29,665	30,025	+1·21	6·43	6·35	−0·08
85	6,377	6,580	+3·18	3·50	3·30	−0·20
	FEMALES					
0	100,000	100,000	—	62·88	62·79	−0·09
1	94,545	94,513	−0·03	65·48	65·42	−0·06
2	93,273	93,254	−0·02	65·37	65·29	−0·08
5	92,024	91,975	−0·05	63·24	63·18	−0·06
10	91,082	90,952	−0·14	58·87	58·87	0·00
15	90,420	90,307	−0·12	54·28	54·27	−0·01
20	89,383	89,287	−0·11	49·86	49·86	−0·02
25	88,133	88,056	−0·09	45·55	45·52	−0·03
35	85,353	85,272	−0·09	36·87	36·83	−0·04
45	81,660	81,582	−0·10	28·30	28·26	−0·04
55	75,290	75,193	−0·13	20·23	20·20	−0·03
65	63,046	63,073	+0·04	13·07	13·04	−0·03
75	40,040	40,435	+0·99	7·45	7·39	−0·06
85	11,594	12,126	+4·59	4·00	3·70	−0·30

[1] The Registrar-General's Decennial Supplement. England and Wales, 1931. Part I. Life Tables. 1936.

[2] Supplement to the 75th Annual Report of the Registrar-General. Part II. Abridged Life Tables. 1920.

RESULTS WITH RECENT DEATH-RATES

Snow's equations were based upon the mortality experience of 1910–12 and the complete life table based upon it, and their applicability to the lower death-rates of recent years might well be questioned. To assess their validity under modern conditions the present numerical test was made.

The last English life table (No. 10) was based upon the death-rates of England and Wales in 1930–32, and an abridged table was therefore constructed, for each sex separately, from the death-rates prevailing in those years. The results are given in the accompanying table. It will be seen that the abridged method gives results which agree well with the values given by the full method. With both sexes the number of survivors at ages up to 55 are consistently rather too few and at ages 65 and above rather too many, but the percentage differences are less than 0·25 per cent. at all ages up to 65.

The expectation of life is consistently slightly too low (except for an equality in males at 55 and females at 10), but at every age up to 75 the absolute difference is never greater than a tenth of a year or the negligible amount of little more than one month. In short, judged by this test, Snow's short method of working gives a perfectly satisfactory result when applied to modern death-rates.

SUMMARY

Abridged life tables for males and females have been constructed by Snow's method applied to the death-rates of England and Wales in 1930–32. The resulting values agree well with those of English Life Table No. 10 and suggest that the method is still applicable under modern conditions of mortality.

We are indebted to Dr. K. Conrad for checking the arithmetic.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

PERIPHERAL ARTERIAL DISEASE

AT a meeting of the Edinburgh Medico-Chirurgical Society last week Dr. W. Melville Arnott and Mr. J. J. Mason Brown made a communication on the investigation and treatment of obstructive peripheral vascular disease. After giving a summary of the control and functions of the peripheral blood-flow, they pointed out that, whereas nervous vasomotor control is predominant in the skin blood-vessels, the control of the muscle blood-vessels is principally mediated by the products of muscle metabolism. The results of deficiency in the blood-supply to the skin consist in nutritional changes and abnormally low temperature, whereas in the muscles intermittent claudication is the cardinal disturbance. Where arterial obstruction is present the improvement in circulation following the release of nervous vasoconstrictor tonus should be estimated. This is done by warming the blood by immersion of either hands or feet in hot water. Any elevation of temperature in the affected limb following this procedure indicates an increase in blood-flow. It is only in cases showing a substantial rise that sympathectomy should be considered. In most well-established cases of obstructive arterial disease there is no rise of temperature when nervous vasoconstrictor tonus is inhibited.

The principles of treatment are (1) try to limit the cause of the condition; (2) to increase the circulation; (3) to care for the ischæmic area. In discussing the methods of increasing the circulation particular emphasis was placed upon intermittent venous occlusion, originally introduced by Collens and Wilensky, and which Arnott and Brown have used in the treatment of 47 cases. This method consists in the application of a cuff to the thigh or arm of the ischæmic limb and the inflation of this cuff to a pressure of 30–50 mm. Hg for a period of two minutes and deflation for two minutes. The treatment is applied for several hours per day for several weeks. Treatment has been found to relieve the resting pain of ischæmia in a day or two, and in intermittent claudication the walking distance is much increased if treatment is continued for several weeks. Healing or separation of dry gangrenous areas is hastened. In the type of obstructive arterial disease discussed operation on the sympathetic has little place, and the indiscriminate use of periarterial sympathectomy in these cases only brings discredit on an operation which is of value in other types of vascular disease.

PARIS

(FROM OUR OWN CORRESPONDENT)

POSTGRADUATE COURSES

THE arrangements for postgraduate courses in Paris for 1939, under the auspices of the Faculty of Medicine, are now so far advanced that it has been possible to draft a provisional programme, a copy of which is issued as a supplement to the *Presse Médicale* for Jan. 7. Application for attendance must be made to the secretariat of the Faculty. The courses are classified according to the hospitals at which they are given. At the Salpêtrière Hospital, for example, Prof. Gosset and his assistants will give a course on surgical technique between June 5 and 24. The course will include 18 lessons in the theory of surgical technique illustrated by films, and demonstrations will also be given of operations. At the Broca Hospital a special gynæcological course in English has been arranged from June 19 to July 1. The fee for this course will be 400 francs, and it will be given only if at least six students attend. The programme at the Institute of Hygiene and Epidemiology is impressively full and those students who satisfy the examiners will receive a diploma.

EXAMINATIONS FOR MENTAL HOSPITAL APPOINTMENTS

Some idea of the conditions governing hospital appointments, which are as greatly coveted in France as in England, can be gleaned from the *Journal Officiel* for Jan. 1, where particulars are given of a decree governing the examination of candidates for the higher appointments at the mental hospitals of the Seine area. When a vacancy occurs a competitive examination will be held in the offices of the medical director or heads of the mental hospital services. Candidates must be under the age of 53 and must have had more than five years' experience in a mental hospital. Each candidate must submit evidence of clinical work and scientific study, 40 points being allotted to the former and 60 to the latter. The salary for an appointment of this kind ranges from 41,000 francs in the fifth class to 58,000 francs in the first.

THE FRENCH BIRTH-RATE

The Alliance Nationale contre la Dépopulation has just issued one more appeal for more babies. It seems that 1938 yielded only 610,000 births—presumably live-births—the deaths exceeding the

births by some 30,000. On the other hand, births exceed deaths by some 400,000 in Italy, by half a million in Germany, and by more than 800,000 in Japan every year. "France," this appeal says, "cannot live in peace, keep her colonies, fulfil her mission in the world if she shows herself in comparison with other peoples as a dying nation. She has not an hour to lose if she wishes to assure her safety."

DIPHTHERIA VACCINATION

The passage last summer of a law enforcing vaccination against diphtheria in France may have seemed to the ingenuous to be the last word in the matter. But, as Prof. Debré has pointed out, Prof. Ramon who first introduced anatoxin has since been the target for many barbed arrows discharged by ironical and agnostic marksmen. These attacks may have been partly responsible for the remarkable demonstration in favour of diphtheria anatoxin staged in the large amphitheatre of the Pasteur Institute on Jan. 19. Prof. Ramon deliberately absented himself from this meeting so as not to embarrass his critics. The speakers included Surgeon-General Dopter, formerly director of the French Army Medical Service, Professors Sergent, Parisot, Tanon, Lereboullet, and Debré, and M. Moine, the well-known statistician. Large though it is, the amphitheatre was packed. The audience being mixed, lay as well as medical, some of the speeches naturally reflected the difficulties always experienced when an attempt is made to feed at one and the same table guests with a wide range of tastes, but the statistics produced should long serve as ammunition against Ramon's opponents.

AUSTRALASIA

(FROM OUR OWN CORRESPONDENT)

COMPANY PHARMACY PRACTICE

ALARMED at the prospect opened up by the announcement that Boots Pure Drug Company proposed to begin operations in New South Wales, and also by the reported negotiations for a merger with existing chain pharmacies in that state, the pharmaceutical interests appealed to the Premier for legislation to prohibit an extension of company pharmacy. The matter was investigated by an industrial commission whose report recommends that the intended operations of company pharmacies should not be restricted by legislation. From the point of view of the public, the real issue is not between big and small business, but between efficient and inefficient service. The commission found that the company pharmacies at present operating in New South Wales were at least as efficient as the corresponding independent pharmacies and that the standard of the professional work of individual pharmacists was no higher than that of the paid employees of companies.

The possible economic effect on existing pharmacies is a big issue. Large companies carrying on a chain of retail stores will undoubtedly tend to drive the smaller independent pharmacies out of business. There is also the danger of these companies establishing a monopoly to exploit the public. The report reveals the very mediocre earnings of many of the independent pharmacists in New South Wales. Half of them earn less than £300 a year, and only one independent pharmacist was found to earn his living solely by dispensing. Of the others a proportion of their income ranging from 75 to 90 per cent. is derived from more general merchandise.

The report has been severely criticised by the director of the New South Wales division of the Drug Trade Defence Council. It is, he states, a vindication of the American drug-store type of pharmacy where dispensing of medicines is subservient to the supply of fountain drinks, pies, tobacco and cigarettes, and ironmongery. There is also the question of control by oversea interests, and the transference of profits out of the state. No valid objection could be raised to an oversea concern investing capital in a new industry, but in this case the concern would derive its profits from an industry which is already well catered for by Australian firms.

HOSPITAL NURSES

Public hospitals in Victoria have had to face a new problem consequent upon the decision of the Nurses' Wages Board to introduce a fifty-hour week. To comply with the new ruling, nursing staffs of the public hospitals will have to be increased by about 30 per cent. This has caused some concern, for there is a shortage of nurses already and there appears to be little prospect of meeting the unexpected demand. The hospitals also have to face the expense of an increase in salaries and the need for additional buildings in which to accommodate the extra staff. Unless government assistance is received some hospitals may have to adopt a system in which nurses live away from the hospital.

In order to overcome the shortage of nurses in Australia, it has been suggested that the training course should be reduced from three to two years, that better living conditions should be provided in hospitals, and that more fully trained nurses should be employed in paying portions of hospitals in the place of trainees. Nursing as a profession must clearly be made more attractive, and a shortening of hours is a first step in that direction, but improvements in working conditions must add still further to the ever-mounting cost of adequate medical care.

PHYSICAL FITNESS CAMPAIGN

Despite the climatic advantages of Australia, it has been felt for some time in medical and sporting circles that the general standard of physical fitness is much below what it might be. Following a recommendation from the National Health and Medical Research Council at its November meeting, the Commonwealth Government has now decided to inaugurate a fitness campaign and to form immediately a national coördinating council under the chairmanship of the Minister for Health, with invitations to existing state committees to coöperate. A conference will be convened at an early date to set in motion Australia-wide plans to awaken the interest of individuals and organisations in the campaign. The National Health and Medical Research Council also recommended that voluntary health bodies should be subsidised; that the departments of health and education in each state should take an active part in the movement; that immediate steps should be taken to ensure a sufficient supply of trained leaders; and that physical education should be continued through adolescent years. The action of the Commonwealth Government has undoubtedly been influenced by the need for the development of defence measures.

Owing to a diminution in the number of admissions to the rheumatism supervisory centre at the Paddington Green Children's Hospital, London, W.2, the centre has now been closed to new cases. It was opened in November, 1926, with Dr. Reginald Miller as director.

THE AIR-RAID

A series of articles on medical organisation and surgical practice in air attack by
P. H. MITCHINER, C.B.E., T.D., F.R.C.S., *and* E. M. COWELL, D.S.O., T.D., F.R.C.S.

IV—WOUND SHOCK, HÆMORRHAGE, AND BLOOD-TRANSFUSION

THIS is perhaps one of the most important chapters in air-raid surgery, and a practical acquaintance of these subjects should be acquired by all concerned in the treatment of air-raid casualties.

Wound Shock

"Wound shock" is a descriptive term, suggested by one of us (E. M. C.) in 1917, and distinguishes the condition at once from such nervous affections as "shell shock." Wound shock may be defined as "a condition of lowered vitality, resulting from injury, which leads to circulatory failure, with depression of the blood-pressure, lowering of the temperature, concentration of the blood, deficient intracellular oxygenation, and, if unchecked, subsequent death."

RESEARCH IN THE GREAT WAR

In the first years of the Great War wound shock was the terror of the medical officers in France. Men died from shock in the regimental aid posts, in the field ambulances, and in the clearing stations in large numbers and sometimes even when suffering from comparatively trivial wounds. The numerous theories already in existence at the time were not helpful in suggesting lines of treatment. In 1917 the Medical Research Committee of London began a campaign, linking laboratory work at home with clinical observations in France. Observations were made in the trenches; the condition of the men was studied before they were wounded, immediately after being wounded, and in the next few hours on their way down to the casualty clearing station. In this way a clear picture of the initiation of wound shock was obtained. Four factors were recognised as being concerned in its causation: pain, loss of heat (chill), bleeding, and toxæmia (bacterial or other).

It was found that the common variety of wound shock—secondary shock—took several hours to develop, and that if the above-mentioned factors were combated shock did not develop. The conception of the idea that wound shock was largely preventable provided a splendid stimulus to the war-weary army doctor, and undoubtedly hundreds of lives were saved by the preventive treatment adopted in the last year of the war. Full details of this work are to be found in the official "Medical History of the Great War," *The Lancet*, July 26, 1919, the *Journal of the Royal Army Medical Corps*, August, 1928, and publications by the Medical Research Committee, 1917–19.

CAUSAL FACTORS

The fighting soldier on the battlefield is as a rule deficient in fluid, his output being increased by sweating and his intake lessened by a small water ration. These remarks on dehydration will not apply to ordinary civilian casualties.

Pain will, by itself, produce a fall in blood-pressure, which continues until some sedative is given. In the paper in the *Journal of the Royal Army Medical Corps* blood-pressure records are given of a patient suffering from severe renal colic. The maximal pressure dropped in half an hour from 132 mm. to 68 mm. Morphine was then given, and in fifteen minutes the patient was comfortable and the pressure had risen to 134 mm. (fig. 1). Afferent-nerve impulses, unless they actually cause pain, do not appear to produce shock. The experimental work of Bayliss and Cannon shows this. Support is also given from observations made during a forequarter amputation in a feeble old lady aged 72. Pressure readings were taken every five minutes during the operation. A general anæsthetic—gas and oxygen with an occasional whiff of ether—was administered, and the surgeon purposely left the brachial plexus undivided until the end of the operation. The initial pressure of 140 mm. dropped only 4 mm. and had returned to the original level by the time she was back in bed.

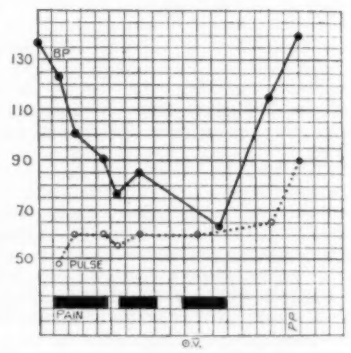


FIG. 1—Chart showing effect of morphine on blood-pressure during an attack of acute renal colic. (From the *Journal of the Royal Army Medical Corps*, August, 1928.)

Wounded men were observed in the trenches to develop shock after trivial wounds as the direct result of chill—e.g., absence of covering on the stretcher—and to recover at once when merely warmed up. Several cases are described in the above-mentioned paper in the *Journal of the Royal Army Medical Corps*.

Loss of fluid from the vessels in *hæmorrhage* may rapidly deplete the circulating fluid, thus assisting in completing the vicious circle which ends in profound shock.

Recent laboratory experiments have been quoted as affording evidence against the hypothesis of *toxæmia* as a cause of shock. Clinically, however, toxæmia seems to be an important factor.

On a warm night in September, 1917, a corporal of exceptionally good physique had his leg blown off by a trench mortar. First aid was given at once, and he lost no blood. He was kept warm, given hot tea, and redressed on a stretcher placed on trestles with a primus stove underneath. He was accompanied by a medical officer during his two-hour journey to the advanced dressing station, and frequent blood-pressure readings showed no fall. At the advanced dressing station his pulse-rate was found to be quickening and his blood-pressure falling. At the casualty clearing station, two hours later, gas gangrene was found to be developing in the muscles of the stump.

Surgeons too have often noticed shock supervening when the tourniquet has been released from a crushed limb.

PATHOLOGICAL CHANGES IN WOUND SHOCK

Reference has already been made to the dehydration of the body as aiding in the development of shock. Examination of shocked patients showed that their blood possessed an increased viscosity, a raised hæmatocrit index, and a greatly diminished volume (Capt. N. M. Keith, R.A.M.C., 1918). Blood taken

from the capillaries often showed a high hæmoglobin content and a raised red-cell count, while venous blood taken at the same time from the same patient gave lower readings. This capillary stasis in vital organs, such as heart and brain, damages both the heart's muscular action and the medullary vasomotor centres. The already low blood-pressure becomes lower, and the vicious circle ends in death, unless the process can be reversed. Cannon states that, if the systolic pressure is left remaining at 80 mm. or lower for more than four hours, recovery is hopeless. The failure of circulation and the consequent deficient intracellular oxygenation produce effects from which the nerve-cells cannot recover.

Attention has also been paid to the blood-urea of these cases. As the blood becomes concentrated, so the urea is increased, producing toxic effects. From the practical point of view it is not possible to make these urea observations when dealing with large numbers of cases. It is an easy matter to estimate the hæmoglobin.

PREVENTION

All personnel engaged in the early handling of casualties should be dogmatically instructed in the four causal factors of shock.

Pain is relieved by early administration of morphine sulphate in small doses, repeated if necessary. A tablet (gr. ¼) is placed under the tongue and "¼" marked on the forehead with indelible pencil.

Chill is prevented by avoidance of unnecessary exposure of the patient, covering with blankets, and providing hot bottles for the ambulance journey. At dressing stations suitable stoves may be placed under the stretchers, and in cold weather ambulance cars should be heated. A blanket folded in a waterproof sheet may be carried in a closed stretcher as recommended in the R.A.M.C. Training Manual 1935.

Bleeding is combated by first-aid measures, firm bandaging and splinting of lacerated wounds, even when the bone is not broken, and the judicious use of the tourniquet. As soon as the bleeding has been arrested, administration of fluids restores the depleted circulation and prevents shock.

Toxæmia is prevented by good organisation of the medical services, rapid evacuation, and early surgery. In the first-aid treatment of burns, tannic acid dressings, by their coagulating action, prevent the absorption of toxins and the loss of serum and at the same time stop pain.

TREATMENT OF ESTABLISHED WOUND SHOCK

In dealing with air-raid casualties, as in ordinary civilian accidents, wound shock should be prevented and seldom encountered.

At the dressing stations.—In certain circumstances some cases may be met with at the dressing stations. Here they should be retained and not evacuated until the condition has begun to improve. (There will be a few surgical exceptions to this general rule.) A separate resuscitation department should be prepared and organised. The patients are made comfortable, in beds if possible; they are kept quiet, reassured, and given morphine if necessary. *Réchauffement* is carried out by electric cradles, hot-water bottles, or improvised hot-air stoves. It is *not* necessary to bandage the limbs or to posture the bed. Fluids must be given, unless contra-indicated by abdominal wounds. Simple drinks of warm sweet tea will be sufficient in many cases. If the patient is unconscious, attempts should be made to give glucose saline per rectum or, in critical cases, intravenously. In giving glucose saline intravenously a 10 per cent. solution is used and is best run into the vein slowly. As pointed out by D. Fisher (*Surg. Gynec. Obstet.* 1926, **43**, 224), the best results are obtained by giving insulin at the same time. Normal saline given into a vein will produce a transient rise in pressure, but the effects are not lasting. Gum saline is a useful remedy and may tide the patient over the worst until a blood-transfusion can be given. Blood should not be given indiscriminately (see section on Blood-transfusion).

Wound-shock cases should be carefully watched and be transferred to the surgeon for operation at the right moment.

At the casualty clearing hospital.—The majority of shock cases will be dealt with at the hospitals where the surgeons are at work. A special resuscitation ward should be prepared with beds and a large nursing staff and medical officers in attendance. Here the measures already suggested for the dressing stations are carried out in greater detail. More blood-transfusion treatment will be possible in this ward and severely wounded casualties made fit enough to stand operation.

SURGERY IN SHOCK

In air-raid surgery the ideal to aim at is to operate on the cases *before* shock develops. A fatal result will almost certainly follow if a patient is operated on while still suffering from shock. Careful watch must be kept for the right time to send the patient into the theatre. At the operation every precaution must be taken to maintain the body-temperature and to avoid chill. Many operations will only be possible if a preliminary blood-transfusion is given on the table. The choice of anæsthetic is important. Nothing but gas and oxygen is justifiable in these cases (see *Lancet*, Jan. 21, p. 173). Speed in operating is important, and this depends largely on good team-work. In amputating crushed limbs, the original tourniquet should, if possible, be included with the part removed. (A well-trained first-aid operator is taught to apply the tourniquet as near the damaged part as possible.) Removal of the first tourniquet has been followed by a profound fall of blood-pressure, presumably due to the flooding of the circulation by pent-up toxins, bacterial or otherwise.

Certain cases, such as chest wounds with a large open pneumothorax, can be saved only by early surgical interference, and the risk of operating in shock must be undertaken. Blood-transfusion, both before and after operation, will often support the patient and enable him to recover after the operation. In Spain at the present time the importance of preventing shock is fully appreciated. The principal method of treatment consists in blood-transfusion.

Hæmorrhage

It has already been stated that in air-raid casualties massive lacerated wounds with compound fractures and multiple lesions may be expected. Vessels are injured and, if untreated, patients may die from continuous capillary oozing as well as from wounds of large vessels. The natural mechanism of the arrest of hæmorrhage may be successful even in wounds of the large vessels. The femoral vein has been found completely severed by a missile, 20 hours after the receipt of the wound, and the patient's general condition was not too bad. Continuous unchecked oozing from a wound of moderate size may be more dangerous than bleeding from a severed limb. The former may be inefficiently dressed, but the latter attracts notice and is treated with a tourniquet.

EFFECTS OF LOSS OF BLOOD

If a depleted circulation is not treated and the pressure is allowed to remain low too long, there is

deficient intracellular oxygenation, the vital centres are affected, and the patient will die as in shock. Speed in dealing with hæmorrhage is essential, and priority of treatment must always be given when possible. Once the bleeding has been arrested, the administration of fluid, by mouth or by rectum, will suffice to restore the blood-pressure in cases in which not more than 2–3 pints of blood has been lost. If the hæmoglobin falls to 40 per cent. (Haldane), arrangements should be made to give a blood-transfusion as soon as possible. No patient who is exsanguinated should be given an anæsthetic until his hæmoglobin has been raised to 70 per cent. by a preliminary transfusion. It has recently been stated that it is unwise to rely on the hæmoglobin percentage alone, and that it is better to estimate the blood-volume by the Congo-red method. In a rush there is time for neither of these methods, and to save life blood must be freely given in *all* exsanguinated patients. After the surgeon has dealt with the source of the bleeding, whether in a limb or in the abdomen, a second transfusion may be necessary.

TREATMENT OF HÆMORRHAGE

First aid.—Various forms of "hæmostatic" bandage have been devised and advocated from time to time. Pressure over the wound by a firmly applied shell dressing will, however, check the bleeding in most cases. Large wounds should be firmly bandaged over a splint and the patient evacuated as soon as possible on a stretcher. A knowledge of arterial "pressure points" should be instilled into the first-aid personnel, many instances being on record when appropriately applied pressure has saved a life. Efficient first aid, if carried out with the minimum of delay, is definitely desirable. In Barcelona the value of speed is so appreciated that casualties are often taken direct to hospital without preliminary dressings. It is important for the doctor himself to recognise internal hæmorrhage early and to teach the first-aid personnel to watch for increasing pallor, quickened pulse-rate, air-hunger, and restlessness. In internal hæmorrhage, morphine and rapid evacuation on a stretcher to a surgical centre alone afford a chance of saving the patient's life.

The tourniquet.—Many types of tourniquet exist, but probably the improvised types are the most useful. Careful judgment is required in their application; unless a large artery is obviously injured, the tourniquet should be applied only after the simpler methods of treatment have failed. If applied the tourniquet should always be put on as far down the limb as possible—i.e., near the wound—so that the blood-supply of uninjured parts is not interfered with. The rule of relaxing the tourniquet after fifteen minutes should be observed, but it should be left in situ, with an orderly ready to tighten up again if necessary. Tourniquets are freely used in Spain in dealing with civilian casualties. They are applied by the ambulance attendants and may be the only thing applied before admission to hospital. Wherever a tourniquet is applied, the fact must be clearly indicated, together with the time of application by marking the patient's card, or putting a "T" on the forehead.

In hospital.—Priority will always be given to hæmorrhage cases. They should be marked by an "H" on the forehead or distinguished by a red label. Ligature of a large vessel, or arrest of hæmorrhage by the application of a Spencer Wells forceps, is one of the few life-saving "operations" permissible "on the field" or in a dressing station. Simple suture of the skin over a large bleeding wound may also save the patient.

Blood-transfusion

The technique of simple blood-transfusion is well known and will not be described here. In air-raid surgery, however, it has been found necessary to transfuse large numbers of casualties at a time, and useful modifications in organisation and technique have been devised. It should seldom be necessary to cut down on a vein to insert a cannula, even in children. With practice it is almost always possible to give the blood straight into the vein through a suitable needle. The continuous-transfusion method of Marriott and Kekwick has a definite place in blood therapy.

It was agreed at the International Blood-Transfusion Congress held in Paris in 1937 that from Jan. 1, 1939, the international nomenclature would be adopted. The Moss nomenclature of groups I, II, III, and IV will become respectively AB, A, B, and O.

SUPPLY OF DONORS

The idea of giving blood to save life appeals to the public, and in Great Britain there is no difficulty in obtaining sufficient volunteers. When the blood of these people has been grouped and examined bacteriologically, the donors are card-indexed and are available for service when called upon. The blood-transfusion service of the British Red Cross Society has been in existence for several years, answering 4854 calls in the first nine months of 1938. Plans have been drawn up to meet such demands as might arise as a result of air-raids. For London and the vicinity a central depot has been prepared with the necessary protected accommodation for laboratories and personnel. Here two large refrigerators, capable of storing 1000 bottles of blood, have been designed in an underground store. As a start, 200 donors daily have been allowed for and arrangements made to test and store the blood in refrigerator A. Unsuitable blood would be destroyed at once and the rest, having passed all tests, transferred for use to refrigerator B. Suitable donors are to be card-indexed and will be ready for a second service in 3–4 weeks. Such stored blood is ready for use after the third day and may be kept for a fortnight.

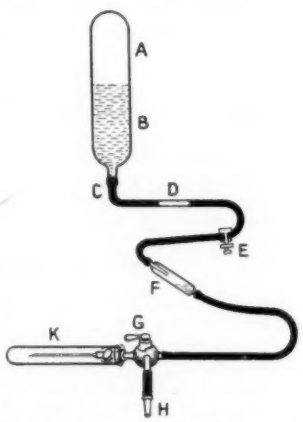


FIG. 2—Auto-injection tube used in Spain for blood-transfusion. A, oxygen under pressure in a glass container; B, citrated blood 400 c.cm.; C, sealed end of tube; D, filter; E, screw clip; F, trap; G, two-way cock; H, attachment for 10 c.cm. syringe; K, bevelled needle in glass tube.

To minimise any individual incompatibility, it is proposed to adopt the Spanish method of mixing six separate half-pints of blood, rebottling the mixture after straining it. This will obviate the need for preliminary cross-testing against the patient's own blood.

The British Red Cross Society is a voluntary service, and donors do not receive payment. In

France a scale of fees is arranged, and in Russia each transfusion costs some £15.

BLOOD-TRANSFUSION IN SPAIN

The Spanish government's blood-transfusion service is a magnificent model organisation, run by the Army Medical Service under the control of Dr. F. Durán-Jordá. There is no difficulty in obtaining blood. In Barcelona alone there are several thousand donors, of whom there are four women to every man. They give 300–400 c.cm. once a month. The group frequency is as follows: AB 3·1 per cent., A 47·5 per cent., B 7·8 per cent., and O 41·6 per cent. The headquarters of the service is in a large building, *el Centro de Transfusión de Sangre de Barcelona*. Here a staff of medical officers and skilled other ranks was recently seen at work, preparing and storing citrated blood in large quantities, ready for immediate use. In the basement are various departments where the separate parts of the glass apparatus are made and rubber tubes and air traps are assembled ready for use. The large storage tubes of thick glass are used over and over again. On the ground floor are various administrative offices, waiting-rooms for donors, and so on. The blood is extracted in rooms on the first floor—30–40 cases being dealt with in a session. The donors fast for several hours before being bled. A large-bore bevelled needle is used and the extraction, aided by water suction, is done by trained orderlies. For mass transfusion, where there is no time to type the patients, blood from universal donors alone is used, 10 c.cm. of a 4 per cent. solution of sodium citrate being added to each 100 c.cm. of blood. When the bacteriological and serological tests have been satisfactorily completed six bloods of the same group are then mixed, filtered, and bottled in the storage tubes already referred to. Air under a pressure of two atmospheres is introduced by a secret process, the tube is sealed, fitted with the apparatus shown in fig. 2, placed in a cardboard box and transferred to an electric refrigerator, where it is kept at —2° C. If not used after 15 days the blood is thrown away. For use in civilian hospitals or if required by the army, a supply is dispatched in a special lorry, in which it is kept cold in a refrigerator worked by a 3 h.p. petrol-driven motor. Blood is given in the *postes de secours* (within 3 kilometres of the firing line) in the Triages as well as in the other hospitals of the forward area.

The method of bottling blood under pressure in the auto-injection tube (*el tubo autoinyectable*) enables the blood to be given quickly if required—indeed the process is known as the "rapid method." The screw clip enables the flow to be regulated so that it can also be given by the continuous-drip method, if required. The administration is simple and is generally entrusted to trained orderlies. An important point in technique is to place the tube of blood in water at 45° C. for twenty minutes before injection.

Blood is given very freely; it is the chief treatment for shock, and several hundred tubes are always in stock, ready for immediate use. The donors give their blood voluntarily, their only reward being a meal of army rations, cooked by men of the army medical service. The dining-rooms are on the top floor of the headquarters building.

The methods of giving stored cadaver blood, as advocated by Shamov and Yudin, have not found favour outside Russia. Violent reactions have been reported, and the question of sentiment is a definite obstacle to the popularity of the method.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A PHYSIOLOGIST IN AMERICA

IV

Dec. 11—Sudden arrival of Christmas visitors in the midst of a flood due to amateur plumbing by the handy-man. Not our visitors, but we had to do our bit in the existing confusion. They live near Reno, which we are given to understand is a lovely city set among hills where the number of marriages greatly exceeds the number of divorces. A girl can walk about the streets unmolested, and its only blemish is the difficulty one has in parking a car in it. The sun shines more there than anywhere else, the air is purer and more invigorating, and the winter temperatures are the lowest in the world (with a few unimportant exceptions). Last year, mother and father and baby were trapped by snow in a gold mine, together with another couple and a baby, for a month. They had about three days' ration of food, the temperature was 42° F. below freezing-point, and the inside walls of the cabin were coated with 2 in. of ice. They were all rescued just in time, the other family having fared the worse no doubt as a punishment for stealing more than their fair share of the food. The baby survived largely owing to cod-liver oil. (This information was imparted to us by Mother with a wealth of detail in a continuous stream which lasted an hour and a half. We made occasional gasping noises and silently observed that the baby had rickets.)

We did not make our escape before Father had said his piece. He is part Irish and part Cherokee Indian and the very devil of a fellow. He can shoot a deer at 800 yards with a rifle every time and knock the ash off a cigarette with a pistol-shot. He has lived where men are men and retain that status only so long as they can "draw" more quickly than the other fellow—somewhere in Central America I think. In Nevada there is no crime, because criminals are brought in across the saddle and burglars are buried. The prisons are empty, and capital punishment (presumably the more formal variety) is by hydrocyanic acid.

He has been all over the world and talks familiarly of England, China, New Zealand, and Ecuador. He lost his first fortune and his first wife simultaneously in a divorce suit and had to start all over again with a 10-dollar bill. He got an oil company well under way after some vicissitudes, but his partner did something felonious with the stock and went to prison, leaving him destitute once more. After further ups and downs his best friend cheated him out of his share in the gold mine where they had spent such an unhappy winter. Now, it appears, they have just heard that the two banks in which they had all their money have smashed. . . . We felt it would be a pity to go West after this.

Dec. 12.—We went to lunch today with B—— at Trumbull College. He has very nice rooms, including an enormous fireplace and a log fire. It is curious that over here they speak rather wistfully of our open fires, yet when they have one, which is not infrequently, it is always the fireplace we dream of in England. The kind of thing you can stand up in, with no stint of logs. The College dining-room was rather like a church inside but had partially panelled walls and a minstrel gallery at one end. This was decorated with evergreens. B—— said they had already had their Christmas party, which included a dinner of roast duck. From the purely gastronomic point of view it had been excellent, but it was clear to us that B——'s nervous system had not been proof against the shock of having to interrupt the meal seven or eight times for the purpose of singing carols. He and his friend, also English, gravely discussed the impossibility of such an occurrence at Cambridge (or Oxford) during, or even after, a celebration.

Dec. 21.—Yesterday was one of those rapid days, lived to the refrain of "Have I forgotten anything?" and culminating in a well-timed dash for the 6.20 train to New York. We were en route for Toronto—back into the British Empire for Christmas. . . . In the night train from New York were the first sleeping-cars we had seen, outside the cinema. Pairs of double seats, facing each other by day, unfold by night and meet, making a series of bunks along each side of the central gangway (American coaches are much wider than English ones). An upper berth also makes its appearance, folding down from the roof, so that two people can travel very comfortably in a "section." The only disadvantages seem to be the walk along the coach to the lavatories and the acrobatic feat of having to undress on the bed. Each bunk is closed in by black curtains. Half of our car was like this, and the other half was divided up into "compartments." These were just like the sections in the main car but enclosed and along one side only. They contained arrangements for washing. We were rather superior and had a "drawing-room"—the same arrangement of bunks along the window side, plus a third bunk (by day, a couch) along the opposite wall. The lavatory was a separate little room opening off, and the whole was closed by a "front door."

That part of a time-table devoted to fares is bewildering to the novice. There is the ordinary coach fare, which is straightforward, and then the Pullman fare, which is not so straightforward, for there is an additional fee for every possible way of travelling—ordinary, compartment, drawing-room, upper berth, lower berth, and so forth. If you wish to sleep in a horizontal position, it is essential to travel "Pullman."

Did I say "sleep"? Marjorie soon settled down in the small bunk, but we were not so lucky. The room was very hot, and we played about with the heating and electric fan for a long time. Then it was a moonlight night with a good deal of snow about, and Stella, who had the lower berth, kept calling me down my ladder to look at the scenery. I finally refused to take any further interest in Nature and had just dropped off to sleep when there was the most appalling crash, which sat me bolt upright with every hair on end and every nerve tingling. Nothing seemed to be the matter, however, and I tentatively came to the conclusion, subsequently confirmed by further experiences of the same sort, that we had just stopped. Again I dozed off, enjoying the silence and absence of motion, when the night was shattered once more by a whole series of crashes, and the train went into convulsions. This, we afterwards learnt, was due to a little shunting. The couplings on these trains are automatic. The picture of the guard anxiously wafting coaches together, while the engine-driver hangs apprehensively out of his cab, is unknown in this country. The cars are joined on the press-stud principle, and the surest way of sticking them together is to drive them hard into each other and then reverse with a sharp tug to make sure the fastening is secure.

This morning we were turned out at about 8 o'clock into the city of Niagara Falls, which was covered everywhere with snow and ice. We took one of the tours in a car and were shown everything by the driver. The scenes were magnificent and enhanced by the snow. We didn't think the power stations and so forth spoiled the effect at all, though several people had told us we should be disappointed. We had some discussion as to whether we should pay a further $2.50 to go into the tunnel behind the Falls, but finally decided to do so—once in a lifetime—and went down to a cellar in the lift. The other two were taken away, and I was led into a large room lined with hundreds of heavy oilskins and having a row of seats with boot-jacks down the middle. My shoes were removed and a paper hat put on my head. Then I was arrayed in a complete suit of oilskins—sou'wester, coat, gloves, and enormous boots—so stiff that I could hardly move. In a few minutes two strange figures appeared, which I presumed to be my wife and daughter arrayed in similar garb to mine, and we were taken down in another lift and left in a tunnel shaped like an enormous T. The top limb of the T had four openings to the outside world, the right-hand two of which were right behind the falls. There was nothing to be seen from them but a fringe of tremendous icicles and an impenetrable sheet of roaring water. We were drenched at these openings and were glad of our waterproof armour. The noise in parts of the tunnel was terrifying, and we felt the whole thing might be swept away any minute. The tunnel was large enough for us to stand upright but was just hewn out of the rock and left rough with water trickling in here and there. Along each side was a row of pit-props, but these are not calculated to inspire confidence in the uninitiated.

After crossing the border several times on our tour of inspection, we finally boarded the 'bus which was to enable us to rejoin the railroad on the Canadian side. On the way we partly destroyed a private car by backing into it, much to the amusement of the driver (the 'bus driver), and later we were sternly ejected from our vehicle by customs officials. They did not examine our baggage, but when they thought we had been sufficiently chilled—a matter of a few seconds at this temperature—told us to get in again. A long wait at Welland—a waiting-room stuck in an endless expanse of frozen snow—and at last the train for Toronto.

Some days later.—Impossible to write a diary in Toronto: too many Christmas parties . . . too many people . . . too festive altogether. Dull sort of habit, diary writing, anyhow . . . we no longer feel that kind of person at all. I suppose some day I ought to note down the details of this social avalanche . . . but not tonight. The University?—solid, architecturally vague with an indefinable Scottish flavour, well spaced on a very large site, and nothing small or mean in sight. . . . The Connaught Laboratories—unique. A self-supporting blend of research and manufacture (largely insulin), affiliated with the

University. . . . Hart House—seems to be a luxurious club for the University, with another church-dining-room containing amusing stained-glass windows. Cartoons of various academic worthies . . . excellent idea with distinct possibilities . . . distinct possibilities . . . heigh-ho . . . good night everybody.

Dec. 31—There seems nothing particularly odd about sitting here, 3000 miles from home, and making the usual resolutions for the New Year. I wonder if the Old Year has infected us with a desire for travelling and if home will seem dull this time next year. There is no doubt that we have lost a few corners and have ceased to notice such discomforts as sleeping in the train and living practically in one room. In fact we seriously begin to wonder why on earth we habitually burden ourselves with so many possessions and voluntarily adopt so many unnecessary responsibilities, such as a house, maid, and garden. The ease with which one lives here is very attractive. What could be simpler than renting an apartment with the heating, lighting, and refrigeration all arranged for? If anything goes wrong, it is somebody else's job to see to it. The innumerable minor problems of the British citizen do not exist. The streets are full of boys anxious to clean one's shoes, and every drug store offers breakfast. The whole business is very insidious, and more and more one asks "Why not?"

The trouble is, one becomes so used to a mode of life. Last year we were looking forward to the glorious present; next year we shall be looking back on it and wishing it were here again, with all the wonderful opportunities for doing things which now never enter our heads. . . .

* * *

Twelve months later.—That prophecy was only half true. Our sins of omission do not trouble us. In our most sentimental mood we ask for nothing better than the same again, the chance to complete that conversation begun at a farewell breakfast, a glimpse of X's new baby—is it girl or boy? We have so many treasured memories, so many vivid impressions which remain fresh in our minds.

In Washington we have seen the cherry blossom and Judas trees in the sunshine and experienced peace. We have stood at the hewn feet of a mighty Lincoln and felt the presence of greatness. Sitting on the porch of George Washington's home we have gazed over the placid valley of the Potomac and wondered if somewhere in this scene lay the secret of the inspired vision of a simple country gentleman. Further north we have crossed far above the turbulent Alleghany river, already nearly as wide as the Thames at Westminster, and boiling along as madly as any Cheviot burn. There are hundreds of these rivers, with three thousand miles to go before they reach the sea as the Mississippi. They are wild, magnificent, and ruthless, and lend credibility to their human counterparts in Kenneth Robert's "Northwest Passage."

Shall we ever forget sailing among the islands off Buzzard's Bay, the racing tides in the narrow channels, the dazzling uninhabited beach on which we picnicked? Or the wooded shores of Cape Cod in the brilliant moonlight which moved Marjorie to a precocious lyrical outburst:

> "There is only one sun, there is only one moon,
> But there are several stars.
> Moon, moon,
> Where are you going to?
> Where are you going to, Moon?"

At last came New York's farewell to us as with gradually increasing speed we were borne eastwards. She might have looked hard and brilliant, she might have shrouded her head in a cloud, but she did neither. She gradually grew indistinct in the dusk, she left the sea and floated in the evening mist, a shadow, pinnacle on pinnacle, turret on turret, full of twinkling lights: a fairy castle . . . the biggest in the world.

This concludes the four articles from A Physiologist in America. Next month Autolycus will be responsible for these columns.—ED. L.

PUBLIC HEALTH

Vital Statistics for 1938

THE Registrar-General has issued a provisional statement of the figures for birth-rate, death-rate, and infant mortality for the year 1938.

—	Birth-rate	Death-rate	Infant-mortality rate
England and Wales ..	15·1	11·6	53
126 county boroughs and great towns, including London	15·1	11·7	57
148 smaller towns ..	15·6	11·2	51
London (administrative county)	13·4	11·3	57

The smaller towns are those with estimated resident populations of 25,000 to 50,000 at the 1931 census.

Note.—The birth- and death-rates for England and Wales as a whole are calculated on the estimated mid-1938 population, but those for the towns aggregates and for London on the estimated mid-1937 populations. The birth-rate is based on live births and the death-rate on crude deaths.

The birth-rate for 1938 is 0·7 above that for 1933 which was the lowest recorded. For the intervening years the rates have been: 1934, 14·8; 1935, 14·7; 1936, 14·8; 1937, 14·9. The crude death-rate is 0·8 below that for 1937 and with the exception of 1930 (11·4) no lower rate is on record. The infant-mortality rate is the lowest ever recorded, being 5 below that for 1937 and 4 below that of 1935, the previous lowest record. The rates are provisional and are issued for the information of medical officers of health, but they are not likely to need substantial modification.

Pneumonia and Influenza

The Registrar-General's latest weekly return shows that 214 deaths were attributed to influenza in the great towns of England and Wales, compared (working backwards) with 144, 89, and 41 in the previous three weeks. The ratio of the increase between the weeks ending Jan. 14 and Jan. 7 has therefore been rather less than that between Jan. 7 and Dec. 31—namely, 49 compared with 62 per cent. The 214 deaths in the current week are rather more than twice as many (91) as were registered in the corresponding week of 1938. A large proportion of these deaths continues to be derived from northern towns—e.g., 25 from Liverpool, a slight decrease from the previous week's total, and 20 from Manchester, a considerable increase over the previous week. Some rise is to be observed also, however, in some of the southern towns and in London there were 19 deaths compared with 3 and 8 in the two preceding weeks. Notifications of pneumonia rose from 1669 in the week ending Jan. 7 to 1793 in the week ending Jan. 14,

but the latter figure is only slightly above the normal expectation. In London the notifications still remain relatively low.

INFLUENZA IN LIVERPOOL

At the beginning of December, our correspondent writes, Liverpool began to experience an increase of respiratory infections. This soon reached the proportions of an epidemic—an epidemic not specially noteworthy, however, either for the number of patients affected, or for its fatalities. The peak was reached towards the end of the first week in January, with 32 deaths notified as due to "influenza," 81 "total respiratory deaths," and 160 cases of pneumonia in the week. Since then, the numbers have been on the wane. Many of the cases are mild infections of the upper respiratory tract which subside in a day or two with rest in bed and symptomatic treatment. A few are accompanied by gastro-intestinal upset; sinus infection and acute otitis media are occasional complications. Pneumonia sweeps off many of the aged, and may be of the fulminant type in a certain small number of younger persons. But the majority of cases are atypical; some are thought to have nothing more than a severe "influenzal cold" until the presence of labial herpes and rusty sputum leads to an X-ray of the chest and the discovery of a central patch of consolidation. Others are seen from an early stage to have pneumonic consolidation and appear gravely ill; but in a few days a surprising degree of recovery takes place, leaving them pale and debilitated, but alive. In hospital, and less so outside, the clinical picture is being modified by treatment with M. & B. 693; to what extent will not be clear until a more final analysis. There is little evidence that the epidemic is due to *true* influenza; attempts in certain selected cases to isolate the influenza virus have proved unsuccessful. The predominant organism is the pneumococcus. Empyema does not appear to be common, nor does meningitis; a few cases of empyema have shown *Staphylococcus aureus* on culture, and a similar infection of the larynx (with apparent membrane formation) has also been seen in association with pneumonia.

Another Health Centre

The new health centre at Woolwich opened by Lord Horder on Jan. 14 is one of a group of civic buildings surrounding the town hall. Solid in design, yet modern in its planning, it is erected round a court paved with York stone laid in random fashion. At the front and sides it is two stories high, but at the rear, where a spacious waiting-hall has been provided, it is of one story only and it has thus been possible to provide a small roof court, capable of being used as an open-air solarium.

The centre provides for a maternity and child-welfare service, an orthopædic clinic, a massage clinic, an electrotherapy section, a school clinic, and dental and foot clinics. The ground floor contains the maternity and child-welfare section, and the orthopædic, massage, and electrotherapy rooms. There are five special-treatment rooms devoted to orthopædics, electrotherapy (2), and massage (2), a dressing-room, and a bathroom. The upper floor contains the school-treatment rooms—namely, a waiting-room, a minor-ailments room, a doctor's room, an eye-room, and record and clinic rooms. All these communicate with one another and can be used as waiting, treatment, or consultation rooms should the occasion arise. To the right are the chiropody and dental-treatment rooms.

As the centre would in time of war become a first-aid headquarters, two air-raid shelters, in the form of reinforced concrete trenches 3 ft. 6 in. wide, have been installed underneath the car-parks on each side of the building. They are entered from the pram shelters at the rear. The total cost has been £18,066, and the centre has been erected by direct labour under the supervision of Mr. H. W. Tee, the borough engineer and architect.

Opening of New Hospital School

The London County Council has established a new hospital school at Goldie Leigh Hospital, Bostall Heath, Abbey Wood, which is used for children suffering from ringworm and other contagious diseases of the skin and scalp, or who are convalescing after other complaints. The school, which was opened on Jan. 20, has been built at a cost of about £16,500. It is planned on the lines of a modern elementary school, with certain modifications in the finishings to meet medical requirements, such as glazed-tile dados and flush doors of hospital type. Folding doors and sun awnings on the south front of the classrooms allow teaching to be carried on under open-air conditions whenever practicable. The six classrooms each have accommodation for 30 scholars. To enable children suffering from contagious diseases to be separated from the others the classrooms are divided into two sections, each of which has a separate entrance and there are heated cloakrooms and lavatories for both girls and boys. One classroom is equipped as a needlecraft room and another is fitted for the teaching of light wood and metal work. There are two playgrounds and a games field is also available. The instruction is almost entirely individual; an effort is made to secure steady progress in the "three R's" and some oral classwork of subjects of general knowledge is undertaken as well as lessons by radio and cinematograph film. Considerable time is given up to handicrafts. Senior girls receive training in the making of lingerie, fine knitting, embroidery, and leatherwork, and senior boys learn woodwork, metalwork, and elementary bookbinding. Rugwork, basketry, and seagrass seating are also taught, with a variety of simpler occupations for juniors.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 14, 1939

Notifications.—The following cases of infectious disease were notified during the week: Smallpox, 1 (port of Liverpool); scarlet fever, 1565; diphtheria, 1186; enteric fever, 21 (23 "expected"); pneumonia (primary or influenzal), 1793; puerperal pyrexia, 176; cerebrospinal fever, 43; acute poliomyelitis, 17; encephalitis lethargica, 1; relapsing fever, 1 (Looe, Cornwall); continued fever, 1 (Kensington); dysentery, 38; ophthalmia neonatorum, 102. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 20 was 3255, which included: Scarlet fever, 585; diphtheria, 1059 (carriers, 43); measles, 8; whooping-cough, 703; puerperal fever, 15 mothers (plus 7 babies); encephalitis lethargica, 297; poliomyelitis, 4. At St. Margaret's Hospital there were 31 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 4 (0) from enteric fever, 3 (0) from measles, 3 (0) from scarlet fever, 14 (3) from whooping-cough, 32 (4) from diphtheria, 52 (12) from diarrhœa and enteritis under two years, and 214 (19) from influenza. The figures in parentheses are those for London itself.

West Ham reported 2 deaths from typhoid, East Ham and Wimbledon each 1. Fatal cases of diphtheria were scattered

(*Continued at foot of next page*)

LETTERS TO THE EDITOR

X-RAY THERAPY FOR TOXIC GOITRE

SIR,—The accumulating evidence that X-ray treatment is valuable in toxic goitre is of great interest to us; but, when the writer of your annotation on this subject of Dec. 31 (p. 1530) remarks that, if the results are so good, "it is difficult to understand why a form of treatment which has had an extensive trial in the past should have been largely abandoned," we feel that if he had looked up the literature before 1938 he would perhaps have been informed. Though, we believe, before the war certain physicians like Dr. Florence Stoney obtained reasonable results with big doses of small penetrative power that endangered the skin, it is really only since the advent of "deep X rays" in the early 'twenties that efficient treatment has become possible, and our first patient began his exposures in 1924 (*Lancet*, 1934, **2**, 535). By this time operative treatment had obtained a good start; hence the delay in recognition. On Nov. 9, 1937, at a demonstration at the Royal Society of Medicine, out of 28 patients, who had been observed for two years and more, 21 (75 per cent.) might be regarded as "cured"—i.e., could do their former work without difficulty—whilst the remaining 7 were improved (*Proc. R. Soc. Med.* 1938, **31**, 371). This was a better result than we had been able to report in 1934. The length of time since treatment was instituted was from 2 to 12½ years (average 6¼), and the age at the beginning of treatment was from 18½ to 66 years (average 40½).

A point of great importance is the actual dosage to be employed; this question was raised at Cambridge last summer at a demonstration of patients treated by the staff of Addenbrooke's Hospital. Our technique is as follows:—

Five ports of entry, each extending from above the upper limit of thyroid to below the sternal notch—viz.:

1 right anterolateral.
1 right posterolateral.
1 left anterolateral.
1 left posterolateral.
1 central anterior.

Voltage: 185–195 kV.
Filter: 0·85 Cu plus 3 mm. Al.
Applicator: 64–100 sq. cm.
Distance: usually 35 cm.

The ionisation chamber as used is at a fixed distance of 29 cm. and 800–900 r units are given to each area. The slight variations shown are according to size of the gland and occasionally the distance is increased to 40 cm. if the thyroid is very large, the number of r units being increased accordingly. It is advisable to prescribe a few minims of 10 per cent. iodine in spirit to prevent reactions.

The second course is given in three months if necessary, and others are given three-monthly as required. We are, Sir, yours faithfully,

E. P. POULTON,
W. L. WATT.

London, W.1, Jan. 21.

(*Continued from previous page*)

over 22 great towns, 4 at Liverpool, 2 each at Hull, South Shields, Bristol, and Chesterfield. Of the 214 deaths attributed to influenza 141 were reported from the Northern Area: Liverpool contributing 25, Manchester 20, Blackpool, Bolton, and Salford each 7, Birkenhead and Wallasey each 6, St. Helens 5, Barrow-in-Furness, Sheffield, Southport, and Warrington each 4; and 27 from the Midland Area: Birmingham contributing 7, Gloucester 4.

The number of stillbirths notified during the week was 263 (corresponding to a rate of 38 per 1000 total births), including 36 in London.

PSYCHOTHERAPY BY LAYMEN

SIR,—Your leader seems to ignore most of the real facts about lay psychotherapy. I write as a general practitioner who is interested in the Guild of Pastoral Psychology. Lay psychotherapy exists and increases not because it is cheaper than medical psychotherapy but because it is quite different. Every general practitioner is perplexed by an immense number of people who do not suffer from any definite physical or mental disorder but are miserable because they do not know how to order their lives in the modern world. Their problems are not medical, and they are not suitable for treatment by medical psychotherapists. What they want is educational treatment, "social adjustment and relatively simple advice," and instruction in the principles of sensible living.

This is the work that the Guild of Pastoral Psychology is training ministers of religion to perform. It is not medical work. Some general practitioners can do it, and do it admirably, but they are not many, and few of them have the time to spare. Moreover, the work needs not only a knowledge of psychological principles but also a right adjustment to spiritual reality. All members of the Guild of Pastoral Psychology are pledged to obtain a medical examination to ensure that their "cases" are *not* suffering from physical or mental "disease." As I conceive the work of the pastoral psychologist—and as I know the guild intends—any patient who needs physical treatment would continue to attend the doctor's surgery regularly while visiting the minister for pastoral psychology.

The medical profession would do well to realise three things. The first is that lay men and women will do this work increasingly, whatever the doctors may say. The second is that doctors make no collective and very little individual attempt to fit themselves to do it. Thirdly, unless the medical profession will help the "pastoral" psychologist to learn—as he ardently wants to—where his educational or cultural territory ends and where medical territory begins, overstepping of the line becomes unavoidable.

I am, Sir, yours faithfully,

Worcester Park, Jan. 23. ANN HARLING.

SURGERY IN ULCERATIVE COLITIS

SIR,—The questions raised in your leading article on Jan. 21 and by Dr. Gaha in the same issue are of great importance. Although it is now many years since ulcerative colitis began to be seriously studied it is evident that there is still much doubt as to the best method of treatment. This is partly because most of those who have written on the subject have failed to distinguish between the different types of the disease.

In a considerable experience of such cases I have noted that there are four main types:—

(*a*) Mild cases where the symptoms are never very severe.

(*b*) More severe cases which clear up on medical treatment fairly readily, but persistently recur.

(*c*) Bad cases, which are most resistant to treatment and get progressively worse.

(*d*) Acute septicæmic cases, generally in young people, which are usually fatal.

The first two types are best treated medically and do not call for surgical interference, except that the persistent relapses and prolonged periods of illness often most seriously interfere with the patient's

occupation, and on this account appendicostomy may be of benefit in cutting short the attacks and reducing the periods of incapacity. I have frequently seen most beneficial results from the operation in such cases, patients who had become chronic invalids putting on weight and being able to return to an active and useful life. It is in the third type, however, that surgery is particularly called for. These patients seldom show much improvement under purely medical treatment, and I agree with the writer of your leading article that if marked improvement has not occurred in three to four weeks surgery should no longer be delayed, appendicostomy in my opinion being the operation of choice. In the fulminating fourth type nothing is likely to be of any use, but there is reason to believe that some of these cases may be saved by the administration of sulphanilamide.

The particular surgical procedure that should be adopted in any particular case must depend upon circumstances, but operations such as colostomy and cæcostomy are most undesirable and in my experience have given no better results than appendicostomy, while their inconveniences are obvious. Ileosigmoidostomy and other short-circuiting procedures are dangerous in patients who are both in a very low state of health and septic, and have not proved satisfactory. Appendicostomy has the merit of involving little risk: it can, if necessary, be carried out in the patient's bed under local anæsthesia, and provided it is not done too late results in rapid improvement of the patient's condition. It does not, of course, "eliminate infection" but by enabling the pus and debris from the ulcerated mucous membrane to be washed away gives the latter a chance to heal; and if cases are watched with the sigmoidoscope it can be seen that this is actually what happens.

The mortality figures from the operative treatment of ulcerative colitis that have been published are quite unreliable, as far too often surgery has only been resorted to when all other methods have completely failed and the patient has passed the stage in which recovery was still possible. Appendicostomy done in time, and in suitable cases, will very seldom fail to result in curing the condition and in reducing the incidence of relapses.

I am, Sir, yours faithfully,

J. P. LOCKHART-MUMMERY.

Harley Street, W.1, Jan. 23.

SELF-CONSCIOUSNESS AND PUBLIC SPEAKING

SIR,—In thanking Dr. Snowden for his useful article in your issue of Jan. 14, may I add a few notes. With a long personal experience of the speaker's self-consciousness in myself and others from school-days on, I differ from Dr. Snowden only as regards the nature of the fear of which he speaks. There is surely no need to suspect any atavistic basis for this fear. It is a fear merely of what the audience, especially certain individuals in it, may say or think of the speaker's matter, style, manner, or personality. Keenness on his matter and the focusing of his attention on the aims of his speech are the speaker's main safeguards; subsidiary are the rules to avoid catching the eye of known individuals and to begin by addressing the wall, flags, pictures, or notices at the end of the hall or room. The speaker must steel himself to think mainly of and to address the sympathetic minds of those whom, in imagination, he is leading, and only secondarily should he take note of important criticism, treating this not as opposition but as genuine difficulties to be sympathetically explained. This sympathy, in a mixed audience, with excursions from grave to gay, from general to local, from long-term to short-term objects, must be cultivated.

To the rules for public speaking there may be added the need especially to emphasise the final consonant of each word, to slow down towards the end of a phrase, and to pause between sentences and especially between paragraphs and sections. The most painful task is to lead up to and encourage applause, wait for it several seconds and get used to the silence. In teaching a man to speak in public surely it is wrong to draw his attention to the physical symptoms of fear. To do so is to make him notice them. He should be so keen on his matter, aims, and audience that he does not notice them. He should not even know of them.

In composing an important speech the speaker should first state what he is going to say, then say it, and lastly sum up what he has said. But practice is everything. He must learn to pose, out of respect for his responsibilities and himself; he must take any opportunity of beginning in small ways, as in seconding a vote of thanks; he must offer his services, however small, and not wait to be asked. Practice alone makes perfect. Would that every medical man would in common sense learn so to express himself in public as he invariably does in private. He does not mind committing himself on paper or to a committee or court of law or a professional gathering. It is ridiculous that he, we, and the community should lose so much influence and power from fear of standing on a platform.

I am, Sir, yours faithfully,

Hatfield, Jan. 19. FRANCIS FREMANTLE.

"THE G.M.C. UNDER FIRE"

SIR,—In your annotation last week under this heading you point out, quite rightly, that infringement of professional rules by eminent persons could be met by action "open to members of the M.P.U. itself." It would be a pity if your readers should suppose that such action had not already been taken. Not very long ago I myself, in pursuance of the union's policy, initiated an action against an eminent medical man who was rather given to after-dinner speeches and other public utterances in which he held up to opprobrium his colleagues in general practice. It was part of the case that he did this without warrant of truth or public policy, and it was proposed to bring due proof of all allegations. Indeed, the facts were not in dispute. It will be noted that this was not a case of canvassing or advertisement but one of alleged unprofessional conduct in vilifying colleagues in speech and in the public press. It was a test-case covering questions which have not hitherto been brought before the G.M.C. Nevertheless, the council never had an opportunity to pronounce upon it. It was decided by the penal cases committee, and the decision notified to me, during an interval between meetings of the council. The decision was that the case should not be allowed to go forward. The mere fact that a test-case of this sort, a case arising out of circumstances which were unheard of when the council was formed, should be turned down by a committee without the council's knowledge or approval goes far to discredit the G.M.C. and to justify the views of the Medical Practitioners' Union.

But the case has not been without result. The eminent person has been very quiet of late, and other eminent persons seeking a cheap notoriety by slander-

ing the general practitioner have been much more silent. Should there occur any fresh example of like unprofessional conduct, there need be no doubt that it also would be brought before the G.M.C. if it could be properly proved. No one supposes that a barrister or other professional man who publicly slated his colleagues would be protected by his professional organisation and one hopes that the G.M.C. would abandon their present attitude to such matter.

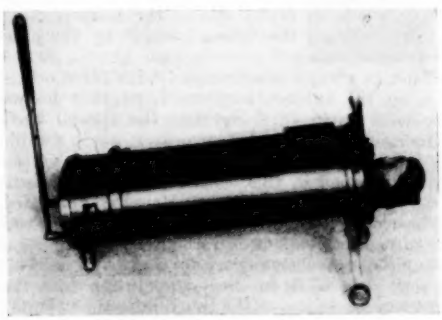
I am, Sir, yours faithfully,

Sevenoaks, Kent, Jan. 20. GORDON WARD.

THE "IRON LUNG"

SIR,—In your issue of Dec. 24 last Sir Leonard Hill points out that when Drinker's "iron lung" was brought to this country in 1930, and purchased by a manufacturer, in accordance with medical custom patents were not taken out. It should not be forgotten however that three American patents had already been granted to Philip Drinker. In 1935 the licencees under the patents brought an infringement suit against a second firm which had begun to manufacture similar mechanical respirators in 1931 (Rossman, J., *Science*, 1935, **82**, 221). This action at law failed, and the patents were declared invalid on the ground that all the claims of the patents had been anticipated by earlier publications.

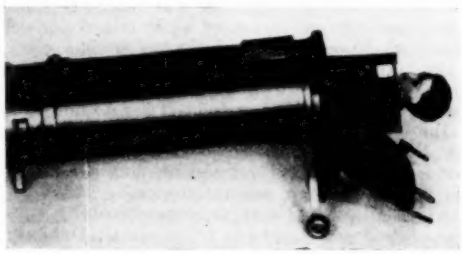
Sir Leonard states that the various modifications of the machine introduced into England in 1930, including the one being presented by Lord Nuffield, are all "on Drinker's principle and in justice to him should be referred to as Drinker respirators." Whilst it is true that Prof. Drinker produced a serviceable machine at a time when it was greatly needed, the credit for the first application of the underlying principle to a successful mechanical respirator belongs not to him but to the late Dr. Woillez, whose "spirophore" was invented in 1876 and described by him to the Académie de Médecine on June 20 of that year. It consisted essentially of a steel



The spirophore closed.

cylinder enclosing the body of the patient, a rubber collar round the neck providing an air-tight seal. The hand-operated pump was incorporated in the cylinder itself. The machine promptly earned a silver medal at an exhibition of life-saving devices at Havre. In spite of the persistent desire of the maker of the apparatus, Dr. Woillez refused to patent his invention. "Idée," remarks a recent commentator, "bien française et nullement américaine" (Woillez, A., *Bull. Acad. Méd. Paris*, 1938, **119**, 82). At a later date, a similar apparatus was for a long time in use at Strasbourg.

I do not seek in any way to belittle the part played by Prof. Drinker in the development of the modern "iron lung," but if we are to acknowledge that the credit for the introduction of the principle belongs to any one man, then we must undoubtedly award that distinction to Woillez. If an eponymous



The spirophore open.

classification of mechanical respirators be deemed to be inevitable, all variants of the spirophore (such as those of Drinker, Emerson, and Both) should in future bear the name of Woillez in addition to that of their immediate inventors.

I am indebted to Prof. C. Achard for permission to reproduce the accompanying illustrations from the *Bulletin de l'Académie de Médecine*.

I am, Sir, yours faithfully,

C. L. G. PRATT.

Department of Physiology, University of Oxford, Jan. 21.

MULTIPLE ANÆSTHESIA

SIR,—Dr. Blair Gould takes us to task for using an unjustifiably complicated technique. Our justification lies in our results, which are better than we can show with any other form of inhalation anæsthesia. For example, of 47 consecutive tonsillectomies anæsthetised by the usual methods, 28 vomited; of 45 anæsthetised by the method we have described, 6 vomited. It is inconceivable that a drug which is as toxic as Dr. Blair Gould would have us believe should leave the patient with so little evidence of harm.

As to complexity, we discover the residents have used the method on several occasions with complete success. If Dr. Blair Gould will try the technique for himself, and visit his patients afterwards, we feel he will be less satisfied with his present methods.

We are, Sir, yours faithfully,

RONALD J. B. BROAD,
GEOFFREY ORGANE.

Westminster Hospital, Jan. 23.

PLACENTAL BLOOD FOR TRANSFUSION

SIR,—I was interested to read Dr. Howkins and Dr. Brewer's paper in your last issue, because recently I conducted similar experiments with placental blood while working at the Royal Northern Hospital, London, and arrived at the same conclusion—viz., that the technique was too laborious to be of general practical value.

I took blood from the end of the cord, according to the method suggested by Goodall, Anderson, Altimas and MacPhail, and also with a three-way syringe from the umbilical vein. The latter method gave slightly better results as regards sterility, but the quantity of blood tended to be less. I took all the specimens myself and found that, after the first

few cases, sterility was almost 100 per cent., both to aerobic and anaerobic culture. The amounts of blood obtained were much the same as those of Howkins, and were considerably less than those mentioned by Goodall.

As for the preservative solution I also found that unreliable, and when I was in Moscow last summer I discovered that it was unknown there; if they use a preservative at all it is a 5 per cent. (sometimes 10 per cent.) solution of sodium citrate. In the Ukraine placental blood is actually used for transfusions, although most blood is obtained from voluntary donors as in London. They do not always use the blood immediately, as we do, but it is never kept longer than five days because of the demand. Mild reactions are fairly frequent, but severe ones, with rigors and so on, are uncommon.

I am, Sir, yours faithfully,

Albion Mews, W.2, Jan. 23. G. DALLEY.

PROPHYLAXIS WITH SULPHANILAMIDE

SIR,—In your issue of Jan. 14 Dr. Reginald Lightwood raises a query as to the possibility of damage to the hæmopoietic system of the fœtus from the prophylactic use of sulphanilamide or M. & B. 693.

It is true that the fœtus will have a fairly high concentration of sulphanilamide in its blood during labour, since H. L. Stewart and J. P. Pratt (*J. Amer. med. Ass.* 1938, **16,** 1456) found that the amount of sulphanilamide was approximately the same in maternal and cord blood; but this will usually be for a matter of hours only and the concentration will fall rapidly after birth. The amount of sulphanilamide which the baby will get from the milk during the following days will be very small indeed—something in the order of 0·02–0·06 g. in 24 hours (Stewart and Pratt; S. S. Pinto, *J. Amer. med. Ass.* 1938, **21,** 1914).

Mr. Bryan Williams in a paper read before the North of England Obstetrical and Gynæcological Society reported on the prophylactic use of Prontosil album in 257 cases, and in a personal communication to Dr. L. Colebrook stated that no toxic effects were observed in any of the babies. I agree that a careful watch should be kept for any toxic signs in the baby, but I think it is unlikely, from a consideration of the above facts, that any will occur.

I am, Sir, yours faithfully,

EDWARD D. HOARE.

Queen Charlotte's Hospital Research Laboratories, Ravenscourt Square, W.6, Jan. 23.

OXYCEPHALY

SIR,—May I clarify the point which Dr. Ferriman raises in his interesting letter in your issue of Jan. 14? He wishes to know whether my histological findings in the case of oxycephaly, recently recorded in your columns, support the hypothesis of Park and Powers. These authors consider that oxycephaly is due to absence of the limiting activities of the suture lines in the membrane bones of the skull, a fact of which I was not aware when reporting these sections. My findings appear strongly to support this view. In describing the microscopic appearance of the bones of the skull, I said that "there was considerable evidence of osteoblastic activity to indicate that bone formation was proceeding briskly." I did not intend to imply that this process exceeded the normal rate of bone formation in the fœtal skull at term. There was certainly no evidence of "vicious or pathological excess" of bone formation at the "sutures." As regards the vascularity of the bone, there did not seem to be much difference between the normal fœtal and the oxycephalic skulls.

It seems possible that a study of oxycephaly, at first sight merely a repulsive deformity, may shed some light on the process of normal joint formation and the mechanism which controls the growth of bones. I am, Sir, yours faithfully,

R. S. HANDLEY.

Bland-Sutton Institute of Pathology, Middlesex Hospital, London, Jan. 19.

LEPROSY

SIR,—In a review of my book on leprosy in your issue of Jan. 14 (p. 96) you allude to my denial of the successful infection of experimental animals with the human leprosy bacillus. Unfortunately that part of the book had already been written before reports about hamsters came in. As a matter of fact, we cannot yet say that leprosy can be transmitted in a progressive form to experimental animals, though we hope that the difficulties will soon be overcome. Dr. Adler, in Jerusalem, has still failed to transmit the disease beyond the second series of hamsters, or at least he had at the end of August when I visited him and saw his work.

I am, Sir, yours faithfully,

E. MUIR,
Medical Secretary, The British Empire Leprosy Relief Association.

London, W.1, Jan. 18.

THE FEET OF THE INDUSTRIAL WORKER

SIR,—Mr. Cochrane in his letter of Jan. 7 elucidates most clearly the many factors which contribute to foot-strain. He then says: "It is not possible, so bad are man's sensory impressions, to attain the fully erect position of the body without training of a special kind . . . All the detail for the physical restoration of these people—by rehabilitating rest to recover lost tone, by re-education in correct breathing and voluntary control of the trunk and abdominal muscles—are well known and practised by orthopædists. It is a complete art in itself, this correction of faulty use of the body . . . Let us unite to cure the 'chronic case' by the practice of real orthopædics."

Whilst in complete agreement with Mr. Cochrane's views on the subject may we hope that he would agree with us in thinking that the special work of re-education (which comes nearer to "teaching" than "treating") can be undertaken by practitioners specially trained in this work—namely, the members of the Chartered Society of Massage and Medical Gymnastics? Members of the Chartered Society have for many years been foremost in demonstrating the value of corrective exercises and by reason of the fact that they work in close coöperation with doctor or surgeon are in a position to exercise the "complete art" which Mr. Cochrane most justly recognises, with fullest advantage to the patient concerned.

I am, Sir, yours faithfully,

L. D. BAILEY,
Chairman of the Council, The Chartered Society of Massage and Medical Gymnastics.

Tavistock House, Tavistock Square, W.C.1, Jan. 17.

". . . The idea that publicity is disreputable has to be scotched. No public activity outside the Secret Service can to-day fully secure its ends unless it equips itself with efficient arrangements for interpreting to the public its objects and the measures taken to secure them. That is an essential and an honourable part of the job."—Sir STEPHEN TALLENTS reported in *Birmingham Post*, Jan. 19, 1939.

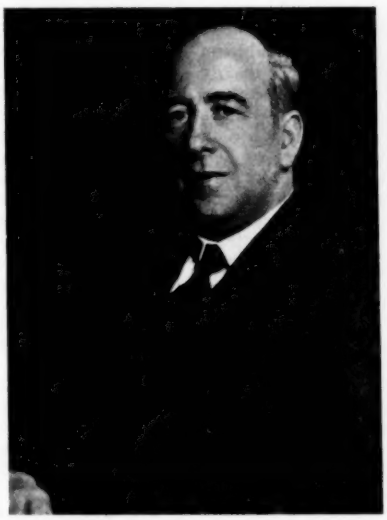
OBITUARY

HERBERT HENRY WOOLLARD

M.D. MELB., D.SC. LOND. AND MELB., F.R.S.

THE sudden death of Prof. Woollard on Jan. 18, at the early age of 49, came as a shock not only to his friends but to all those who are concerned with the development of anatomical teaching and research in this country. It is not easy to assess his work briefly; but his contributions to anatomy, direct and indirect, were so notable that it is at least some consolation to reflect on some of his achievements.

Herbert Henry Woollard was a product of Melbourne University where he took his medical degree in 1910. He played an active part in the late war, and attained the rank of a lieut.-colonel in the Australian army medical service. After the war he came to England with a view to working for the fellowship of the Royal College of Surgeons, and for this purpose entered on a course of studies at University College, London. It was in this way that he came under the inspiring influence of the late Sir Grafton Elliot Smith, an influence which was destined to make him completely alter his plans. For after passing the primary fellowship examination he decided to take up the study of anatomy as a scientific career, and to this end he was appointed a demonstrator of anatomy at University College.



[Elliott and Fry

Woollard immediately threw himself with all his energy into his work, and although he was at first involved in a considerable amount of routine teaching (because of a temporary shortage of teaching personnel), he was soon producing original work of a very high standard. His association with Elliot Smith naturally directed his attention first to comparative neurology and the comparative anatomy of the primates, and this interest is reflected in some of his earlier papers. His monograph on Tarsius was outstanding for its detailed analysis of the macroscopic and microscopic structure of this remarkable animal, and it had a considerable influence on the interpretation of its position in primate phylogeny. Other publications of a similar nature dealt with the cerebral cortex of Tarsius, the brain of Orycteropus, the geniculate bodies of lemurs, and the retina of primates. All these papers were distinguished by an originality of approach, and by an insistence on the functional significance of structural variations. It is probably true to say, however, that Woollard was never quite satisfied with descriptive studies of this kind, and that he realised from the start of his career that anatomical problems must be attacked by experimental methods in order to attain results that can in any way be regarded as final and conclusive.

This attitude of mind was further developed during the year which Woollard spent at the Johns Hopkins school of anatomy in America as a fellow of the Rockefeller Foundation. Here he came into close contact with a number of American anatomists who at that time were using and developing experimental techniques in many different directions, and he himself became established as essentially an experimental anatomist. As the result of his work in the States he completed three highly important papers—one on the development of the limb arteries as demonstrated by the micro-injection of living embryos, one (with Wislocki) on the phagocytic activity of hæmal glands, and another on vital staining of the meninges. In this last it was shown that the mesothelial cells of the pia-arachnoid are capable of being transformed under conditions of irritation into freely mobile macrophages.

On his return from America Woollard continued his work at University College, and in 1927 he was appointed assistant professor. At this time some of his best research-work was accomplished, dealing with the innervation of the heart and blood-vessels, and with the degenerative changes associated with beriberi. He acquired a very high degree of skill in the application of the difficult technique of vital staining with methylene-blue, and he used this method to great effect in his study of nerve terminals. He also published in 1927 his "Recent Advances in Anatomy." More than anything else this book has been responsible for stimulating a progressive development in anatomical teaching and research in this country. The static type of anatomy which had become traditional appeared sterile as regards any future development, and in its application to the medical curriculum it had come to surpass the bounds both of expedience and decency. "Recent Advances" called vigorous attention to the vitality of anatomical science in other countries (particularly the United States), and demonstrated that as a means of approaching problems of structural organisation, the methods of experimental anatomy offer unique opportunities. Woollard's influence made itself felt by several of his contemporary colleagues, and it can be truly said that he was responsible for initiating a movement to reorientate and revivify anatomy, a movement which is just now, at the time of his death, beginning to gather in momentum.

In 1928 Woollard was appointed to the chair of anatomy at Adelaide University. Two years later, however, the chair of anatomy at St. Bartholomew's Hospital medical college became vacant, and his appointment to this position brought him back once more to England. It is interesting to recall that his appointment was viewed with apprehension in some quarters, on the ground that since he had been so prolific in research he would therefore not be likely to be interested in, or give due attention to, his duties of teaching and departmental organisation. But this fear was entirely unfounded. His critics had little realised the extent of his energies and his conscientious attitude towards his routine duties. He had accomplished his extensive programme of research not by neglecting his other duties but by putting in about twice as much work in twenty-

four hours as many of his fellow anatomists. He spared himself not at all, and at one time in his career it was unusual for him to leave his laboratory before midnight. His industry and tirelessness were amazing, more especially in one of not too robust a physique. Asked how he came to have so good a knowledge of German (he was the author of "The Scientific Basis of Anatomy"—an English version of a German book on the Philosophy of Anatomy) he replied that he had never lived in Germany; yet on being challenged he proceeded to read at random from a German technical book, translating as fast as he could speak. He had mastered the syntax and written word, without any aid but his intelligent use of textbooks and a dictionary, when faced by the necessity of undertaking the translation of the Philosophy.

The appointment at Bart's was an unqualified success. Not only did Woollard distinguish himself by the stimulating character of his teaching and his powers of organisation, but he proved himself to be an ideal collaborator with his clinical colleagues. The latter were not slow to recognise his qualities, and continually sought and received his advice and help in all problems which had an anatomical reference. Anatomy meant to him appreciation of function as well as of structure: he regarded radiological apparatus as an essential part of his equipment, and the teaching of minute as well as naked-eye structure as the province of the anatomist. Although he was one of the pioneers of the scientific and academic outlook in anatomy he had formulated his objective before he became a teacher and while he was still in medical practice, and thus arose the interesting paradox that the man who was feared by examination candidates because of his "scientific" outlook was the very man who really knew what was most appropriate for medical students in the ancillary subjects. The student who knew his ordinary anatomy reasonably well and understood something of its application to modern surgery had nothing to fear from him, no matter what form the actual examination might take. "In many years of examining," a colleague says, "I have never met so quick and accurate, and yet so generous an assessment of a candidate's abilities and potentialities."

When he finally left St. Bartholomew's on an invitation to the chair of anatomy at University College (which had become vacant on Elliot Smith's death), Woollard left behind him a permanent memorial in the magnificent new department of anatomy which he was responsible for planning and equipping. He quickly rose to the executive of any institution he served and at Bart's as elsewhere his intense interest in the medical college, his loyalty, and his administrative gifts brought him power which he used with vision and discretion.

Woollard's appointment to University College in 1936 was welcomed by all his colleagues as appropriate, and indeed inevitable. He rapidly collected in his department a small band of enthusiastic and devoted workers who engaged themselves in several productive lines of research under his direction and guidance, and it became evident that University College was likely in the future to uphold its reputation as a breeding-ground of anatomists. As regards his own research, Woollard now concentrated his attention mainly on problems of peripheral sensation. He had for some years been using himself as an experimental subject and aimed at correlating the distribution of different sensory spots in his own skin with different morphological types of nerve-ending. It is a tribute to his enthusiasm for his research that this method of experimentation involved not a little personal discomfort in the numerous small but painful operations which he permitted to be carried out on himself, in order to obtain material for histological study. In 1936 and 1937 several papers were published recording the results of these observations, and in 1938 the importance of his work was recognised by his election to the Royal Society.

It was just at this stage of his career that Woollard died. He himself was in the middle of a comprehensive and systematic programme of research, a number of junior members of his staff were being effectively trained by him in methods of teaching and research, and his flourishing department showed every sign of developing into an even more distinguished centre of anatomy. It is no wonder that his colleagues and those who are interested in medical education in London feel shocked at the loss which they have sustained.

We owe much of this record to Prof. W. E. Le Gros Clark, who writes in conclusion: "Woollard was one of those men who for weeks and months on end give all the energy of which a human being is physically capable to sheer hard work. He worked continuously, for his students and demonstrators, for his department, for his school and university, and for the subject which he represented so effectively. Only his most intimate friends knew that during the last two or three years he was often working against almost intolerable odds. He himself suspected cardiac trouble because of the acute anginoid pain which attacked him from time to time, and his suspicions were shown to be well justified at his death. Yet the physical and mental strain that were thus imposed upon him did nothing to deter Woollard from fulfilling his duties to the utmost. We mourn a colleague of singular nobility and tenacity of purpose, and a friend of a most lovable character." Others speak of his brilliance in conversation—his rapidity in attack and his ready repartee—and his generosity to other people's labours: "if their work was genuine scientific work, a seeking after truth, he would regard it, however small an effort, as quite as important as anything he had ever done himself."

Thinking of him first as a teacher, a close associate, Prof. John Kirk, recalls that like his great predecessor at University College, Woollard believed that the teacher's duty was not so much to reiterate the facts which were already made abundantly plain to every zealous student in the laboratory and dissecting-room, but to emphasise the interpretation of these facts and to give the student a true understanding of the processes which had brought structure to its final form, perfectly adapted for its destined function. "It was little wonder, then, that so many of his students entered into their heritage and were able to grasp the significance of anatomy as a science as well as a vital part of the medical curriculum. Like all true scientists Woollard was a tireless worker because he loved his work, and he was a stimulating teacher because his lectures were fresh and replete with his own thought and inquiry which ranged from the heart to the periphery of his subject.

"His memory of things which he had seen and heard and read," adds Prof. Kirk, "was remarkable. In his research-work he was in excelsis. His own personal output as well as that to which he inspired others who worked under his suggestion and guidance was enormous. It was never work merely for work's sake but always the response to some problem which cried out for solution and which would provide the key to a better understanding of physiological or pathological processes. Terra cognita and regional

anatomy which had already been explored and mapped in detail made little appeal to his fertile mind. It was the circumference of the ever-widening circle of anatomical and physiological knowledge which attracted him and for which he spread around him a contagious enthusiasm.

"The title of his well-known publication 'Recent Advances in Anatomy' was typical of the man and no one could have done it better. In his private room at University College there hung a translation of Pavlov's Bequest to the Academic Youth of his country, dated Feb. 27, 1936 :—

Perfect as is the wing of the bird it never could raise the bird up without resting on air. Facts are the air of a scientist. Without them you never can fly. Without them your 'theories' are vain efforts. But learning, experimenting, observing, try not to stay on the surface of the facts. Try to penetrate to the secret of their occurrence, persistently search for the laws which govern them. Be passionate in your work and your searchings.

This was Woollard speaking as well as Pavlov. It is not surprising, therefore, that at the comparatively early age of 49 years he had lived a life so fruitful in its results and so useful to his fellows. Those of us who were privileged to enjoy his friendship and leadership feel a loss which cannot be put into words and our deep and understanding sympathy is with the inner circle in the home where as husband and father he is missed most of all."

MEDICAL NEWS

University of Oxford

On Jan. 19 the degree of B.M. was conferred on S. Durham and J. E. Duffield.

Dr. B. G. Maegraith has been elected dean of the medical school for four years.

The degree of M.A. was conferred by decree on Dr. A. H. T. Robb-Smith, Nuffield reader in pathology.

University of Cambridge

On Jan. 21 the following degrees were conferred :—

M.A.—W. S. Feldberg (university lecturer in physiology).
M.B., B.Chir.—E. P. Jowett, W. R. Gavin, R. H. H. Williams, John Watson, G. H. Evans, E. S. Dismorr, E. W. Somerville, C. W. C. Gough, C. J. Rooke, R. C. H. Tripp, and M. McC. Wilson (by proxy); H. L. Porter, A. G. H. Clay, John Clutton-Brock, A. L. Phillips, B. M. Wright, J. R. Bignall, B. R. Bray, M. E. Moore, J. M. Wilkin, G. A. Fowler, G. C. Pritchard, Derek Russell-Davis, C. H. C. Dent, and T. G. S. James.
M.B.—C. E. Elliott and R. G. Bickford.

Society of Apothecaries of London

At recent examinations the following candidates were successful :—

Surgery.—N. B. Eastwood, J. B. Headley-Blythe, and R. Rowlandson.
Medicine.—H. B. O. Cardew, E. M. E. Decottignies, N. B. Eastwood, V. W. J. Hetreed, and E. S. Nicholson.
Forensic Medicine.—H. B. O. Cardew, E. M. E. Decottignies, N. B. Eastwood, V. W. J. Hetreed, and E. S. Nicholson.
Midwifery.—N. P. Desai, M. C. Mair, J. C. Scott, E. A. Spouse, and P. P. Vaidya.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: H. B. O. Cardew (Guy's), E. M. E. Decottignies (King's Coll. Hosp.), J. B. Headley-Blythe (Bart.'s), V. W. J. Hetreed (St. Mary's), E. S. Nicholson (Oxfd and Guy's), and R. Rowlandson (Camb. and Guy's).

University of Wales

At recent examinations at the Welsh National School of Medicine the following candidates were successful :—

D.P.H.

Part II—Jennet Evans, Anne E. M. Herbert, and Mary M. M. Llewellyn.

International Congress of Comparative Pathology

The fourth International Congress of Comparative Pathology will be held in Rome from May 15 to 20. Further information may be had from the hon. secretary of the British national committee, Mr. Fred Bullock, LL.D., 9, Red Lion Square, London, W.C.1.

Royal Institution of Great Britain

On March 10, at 9 P.M., Prof. E. D. Adrian, F.R.S., will deliver a Friday evening discourse at the Royal Institution, 21, Albemarle Street, London, W.1. He will speak on the development of the sense of hearing.

Hunterian Society

On Thursday, Feb. 9, at 7.30 P.M., this society will hold its annual banquet to commemorate the anniversary of the birth of John Hunter. It will take place at the May Fair Hotel, Berkeley Street, London, W.1, and the Lord Mayor of London will be present.

The title of Mr. Sampson Handley's Hunterian oration, to be delivered before the Royal College of Surgeons at 4 P.M. on Feb. 14, will be Makers of John Hunter.

Course on Industrial Hygiene

A short intensive course on industrial hygiene, including industrial physiology and medical industrial psychology, will be held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, from Feb. 6 to 17. Further information may be had from the secretary of the school.

Postgraduate Courses in Germany

International postgraduate courses in the various specialties will be held in Berlin, Vienna, Hamburg, Cologne, Munich, and other medical centres during 1939. Further particulars may be had from the bureau of the Berliner Akademie für ärztliche Fortbildung, Robert Koch Platz 7, Berlin, N.W.7.

Medical Society of Individual Psychology

The annual dinner of this society was held at the Florence Restaurant on Jan. 19, with Dr. H_3 C. Squire in the chair. Prof. John Macmurray, who proposed the toast of The Society, asked his hosts why they called themselves "individual psychologists," for Adlerian theory always laid stress on the social character of human motives and behaviour. He thought the fundamental humility and broadmindedness which were its tenets created a favourable atmosphere for an association of people who were capable of making a stand against sectarianism and were willing to envisage a modification of views they had hitherto held. He felt that this attitude was of fundamental importance today, for we were part and parcel of a sick world and the centre of the trouble was always psychological. We were living in a period of scientific development in human relations with one another and the only solution to our troubles lay in that field. Yet we resolutely turned our eyes away from any question of changing ourselves and insisted that the difficulties lay in the external world. At the beginning of the "Contrat Social" Rousseau said he would take men as they are and societies as they ought to be. We were still saying the same today. But what was society, Prof. Macmurray asked, but people in relation to each other? He often heard it said that all our troubles were economic but why should economics be considered an objective science governed by inexorable laws? Was it not really a study of human behaviour in one particular field? The real problem of our world was the rational ordering of personal relationships and if we did not solve it our civilisation would be thrown on the scrap-heap. He thought that the society was peculiarly fitted to help in this task and he wished it long life and prosperity. The Chairman, who said he rose as a simple squire among professors and dukes, replied for the society, and Dr. Alexander Sandison welcomed the guests in a witty and graceful speech. Mr. Ashley Dukes, who replied, confessed (without inhibition) that he enjoyed after-dinner speaking enormously, and proceeded to delight his audience and himself.

Medical Cruise to Egypt

The *Bruxelles Médical* is arranging a cruise to Egypt and Upper Egypt at Easter this year. The tour will leave Marseilles on March 31. Further information may be had from the secretariat, 89, Boulevard Adolphe Max, Brussels.

Naval Medical Compassionate Fund

At a quarterly meeting of the directors of this fund, held on Jan. 20 with Surgeon Vice-Admiral P. T. Nicholls, medical director-general of the Navy, in the chair, the sum of £126 10*s*. was distributed among the several applicants.

Hospital Management

The Royal Sanitary Institute is arranging a discussion on some problems of hospital management, to be held at 90, Buckingham Palace Road, London, S.W.1, on Tuesday, Feb. 14, at 5.30 P.M. Dr. Andrew Topping will be the first speaker and Dr. Thomas Orr will take the chair.

Imperial Social Hygiene

The ninth Imperial Social Hygiene Congress will be held in London at B.M.A. House, Tavistock Square, W.C.1, from July 10 to 14. The preliminary programme includes an inaugural address by the Rt. Hon. L. S. Amery, M.P., the president, on progress in social hygiene, 1937–39. Others taking part in the meeting will include Sir Ronald Storrs, Lord Horder, and Sir Arthur MacNalty.

Society of Public Analysts

The next meeting of this society will be held jointly with the food group of the Society of Chemical Industry on Wednesday, Feb. 1, at 8 P.M., in the rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1. Prof. J. C. Drummond, D.Sc., Dr. R. A. McCance, Prof. H. D. Kay, D.Sc., and Prof. E. C. Dodds will speak on the analysis and differentiation of the composition of iron, phosphorus, and calcium compounds in respect of nutritional requirements.

Swiney Prize

The Swiney prize for 1939 has been awarded to Prof. John Glaister, regius professor of forensic medicine in the University of Glasgow, and Prof. J. C. Brash, professor of anatomy in the University of Edinburgh, for their book on Medico-legal Aspects of the Ruxton Case. The prize is offered every five years, for the best published work on medical or general jurisprudence alternately, and the award is made by a joint committee of the Royal Society of Arts and the Royal College of Physicians.

A Course at Jena

In conjunction with the institute of scientific microscopy and applied optics of Jena University, the firm of Carl Zeiss of Jena are organising from March 27 to April 1 a course of microscopy, microphotography, microcinematography, micromanipulation, and luminescence microscopy, and also in absolute colorimetry, interferometry and spectral analysis, with particular reference to medical and biological work. A detailed programme may be had from Carl Zeiss (London) Ltd., Mortimer House, Mortimer Street, W.1.

The Cancer Bill: a Deputation

In the course of consultations he is carrying on with bodies interested in the Government's Cancer Bill, Mr. Walter Elliot, the Minister of Health, conferred on Jan. 19 with a deputation from the Royal College of Surgeons. The members were Mr. Hugh Lett (president), Prof. G. Grey Turner and Prof. R. E. Kelly (vice-presidents), Sir Cuthbert Wallace, Prof. G. E. Gask, and Sir Charles Gordon-Watson, and they presented a memorandum drawing special attention to the necessity for early and accurate diagnosis of cancer, increased facilities for the training of radiotherapists, the establishment of a national cancer institute, and the appointment of an advisory committee on cancer. The Minister informed the deputation that he had already decided to appoint a special subcommittee of his medical advisory committee to advise him on the subject of cancer.

Nursing and National Service

The Central Emergency Committee for the Nursing Profession, recently appointed by the Minister of Health, is now established in an office at Romney House, Marsham Street, London, S.W.1. Nurses who have already registered for emergency service with the College of Nursing will have their forms sent on to the committee.

London Scientific Film Society

This society is now half way through its first season and has shown films ranging over many scientific subjects from biology to engineering. Particulars and provisional programmes may be had from the secretary at 28, Hogarth Road, S.W.5.

MEDICINE AND THE LAW

Swab-counting

Is the counting of the swabs used during a surgical operation the exclusive responsibility of the operating surgeon? The existing uncertainty is likely to be cleared up when the Court of Appeal gives judgment in the case of Mahon *v.* Osborne (in which the Medical Defence Union is concerned). At the Manchester assizes, before Mr. Justice Atkinson and a special jury, Mrs. Mahon succeeded in obtaining over £600 damages against Mr. Osborne, resident surgeon at the Park Hospital, Davyhulme, in respect of the death of her son. The patient underwent an operation in the hospital for abdominal trouble. Subsequently a second operation showed the presence of a swab left in the body. It was beyond dispute that this caused the patient's death. The mother sued not only the surgeon but also the nurse who assisted in the operating-theatre for damages for their alleged negligence. The jury found that the nurse was not negligent; she was therefore dismissed from the proceedings and was not concerned in the appeal. As for the surgeon, there was evidence that he had conducted 600 or 700 abdominal operations, that he was most able, careful, and conscientious in his work. There was evidence too of the elaborate system of counting swabs during operations at the hospital; they were carefully checked before and after each operation; this was the first accident of its kind at the hospital where some 3000 abdominal operations had been conducted since 1935. Nobody was able to say that the system was a bad one. Counsel for Mr. Osborne insisted that, if the operating surgeon has himself to make sure that every swab has been removed, the only way is to search the entire abdomen—a course which would prolong the operation and endanger the patient's life.

Whatever the result of the appeal it is clear that the surgeon's position has been appreciated by the tribunal. "What you are saying," remarked Lord Justice Scott to Mr. Osborne's counsel, "is that the total duty to a patient in an operation of this kind must necessarily—if the surgeon is to give the requisite attention to the operation—be divided between him and the nursing staff, and the duty of ensuring that every swab is removed rests primarily upon the nursing staff?" Counsel agreed. "And this division of duty," continued the Lord Justice, "even if it leaves the occasional possibility of tragedy, is still in the interests of the patient?" Counsel agreed again. It was argued for Mr. Osborne that the real issue in the case was whether he made a reasonable search for swabs, and that there was no evidence upon which the jury could find that the surgeon did not make a reasonable search. Lord Justice Goddard, however, was by no means satisfied that

the trial judge would be right in leaving to the jury the question whether the operating surgeon made a reasonable search. If a competent and careful surgeon followed a recognised system, where was his failure of duty? On behalf of Mrs. Mahon it was simply said that it was the duty of the operating surgeon who inserts swabs to remove them; if a swab was afterwards found to have been overlooked, the fact was obvious evidence of negligence. Lord Justice Scott made the comment that, on the cases cited to the court, this was an overstatement of the legal position. Asked by Lord Justice Goddard if he contended that the subsequent discovery of a swab was conclusive evidence of the surgeon's negligence, Mrs. Mahon's counsel answered "No; but it is prima-facie evidence of negligence for him to answer." At an earlier stage Lord Justice Scott had said that the facts indicated an almost certain inference that an extra swab was put in with a swab to which a Spencer Wells clip was attached; the surgeon did not know of it; when he removed all the swabs to which clips were attached, he was quite unaware that a swab had been left behind, because, though he might have touched it, he did not feel it. This "might have happened without any negligence on the surgeon's part." The onus of proving negligence, after all, lay upon the plaintiff.

The Court of Appeal has reserved judgment. The decision, when it is reached, will be of vital significance to both sides—to the surgeons who are entitled to know their liabilities before they attempt to practise their profession, and to the patients for whose health and life the surgeon must work with the greatest possible concentration during the shortest possible time.

Medical Diary

Jan. 30 to Feb. 5

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

WEDNESDAY.

History of Medicine. 5 P.M., Dr. J. A. Nixon: Prisoners of War Released by Napoleon at the Request of Dr. Jenner.

Surgery, Medicine, Anæsthetics. 8.30 P.M., Mr. J. B. Hunter, Dr. H. P. Himsworth, and Dr. J. T. Hunter: Surgery in Diabetic Patients.

FRIDAY.

Otology. 10.30 A.M. (cases at 9.30 A.M.), Mr. W. Mill and Mr. W. M. Mollison: Modern Surgery of the Labyrinth.

Laryngology. 5 P.M. (cases at 4 P.M.), Dr. Bernard Johnson, Mr. T. E. Cawthorne, and Dr. A. P. L. Cogswell: Anæsthesia in Endoscopy.

ASSOCIATION OF CLINICAL PATHOLOGISTS.

SATURDAY.—9.30 A.M. (National Hospital, Queen Square, London, W.C.1.), Dr. V. D. Allison, Dr. R. M. Fry, Dr. A. G. Signy, Dr. F. Camps, Dr. Sinclair Miller, and Dr. L. E. H. Whitby: Diagnosis and Treatment of Streptococcal and Pneumococcal Infections. Dr. N. Hamilton Fairley: Methæmalbumin (Pseudo-Methæmoglobin)—its Synthesis and Clinical Significance. Dr. E. R. Elkan: Xenopus Pregnancy Test. Afternoon, Dr. J. G. Greenfield, Dr. J. N. Cumings, Dr. Janet Vaughan, Dr. Elkan, and Dr. Allison: laboratory demonstrations.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

FRIDAY.—8 P.M. (West London Hospital), clinico-pathological meeting.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2.

MONDAY.—5 P.M., Mr. H. T. Simmons: Relapse following Sympathectomy.

WEDNESDAY.—5 P.M., Mr. A. L. d'Abreu: Congenital Cysts of the Lung and Pleura. (Hunterian lectures.)

INSTITUTE OF PSYCHO-ANALYSIS, 96, Gloucester Place, W.1.

TUESDAY.—8.30 P.M., Dr. Denis Carroll: Choice of Cases.

TAVISTOCK CLINIC, Malet Place, W.C.1.

MONDAY.—4.30 P.M., Dr. H. V. Dicks: Compulsions and Obsessions.

THURSDAY.—4.30 P.M., Dr. T. W. Mitchell: The Latency Period.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.

Daily 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

TUESDAY.—4.30 P.M., Dr. Izod Bennett: Nephritis.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Prof. J. Shaw Dunn: Nephritis, and Renal Changes in Hypertension.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Mr. James Wyatt: Obstetric Emergencies.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. R. Watson Jones: Fracture Dislocations and Other Injuries of the Joints.

ST. GEORGE'S HOSPITAL, S.W.1.

THURSDAY.—5 P.M., Dr. Anthony Feiling: neurological demonstration.

NATIONAL HOSPITAL, QUEEN SQUARE, W.C.1.

MONDAY.—3.30 P.M., Dr. C. Hinds Howell: Poliomyelitis.

TUESDAY.—3.30 P.M., Dr. J. Purdon Martin: Neurosyphilis(I).

WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: clinical demonstration.

THURSDAY.—3.30 P.M., Mr. T. E. Cawthorne: Vertigo.

FRIDAY.—Dr. Denny Brown: Spinal Compression.

Outpatient clinics daily at 2 P.M.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, W.C.1.

THURSDAY.—2 P.M., Dr. Wilfred Pearson: The Pneumonias and their Treatment. 3 P.M., Mr. Eric Lloyd: Treatment of Paralysis due to Poliomyelitis.

Outpatient clinics daily at 10 A.M. and ward visits at 2 P.M.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.1.

WEDNESDAY.—4 P.M., Dr. Saxby Willis: Blood-pressure.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn Road, W.C.1.

FRIDAY.—4 P.M., Mr. C. Gill-Carey: Chronic Otitis Media.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh Road, S.W.1.

FRIDAY.—3.30 P.M., Sir Leonard Hill: The Physiological Action of Methods used in Physical Medicine in the Rheumatic Diseases.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2.

TUESDAY.—5 P.M., Dr. J. E. M. Wigley: Tuberculosis Cutis.

THURSDAY.—5 P.M., Dr. R. T. Brain: Electrotherapeutics. (Chesterfield lectures.)

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

MONDAY TO SUNDAY.—ST. JOHN'S HOSPITAL, 5, Lisle Street, W.C.2, afternoon course in dermatology. (Open to non-members).—LONDON CHEST HOSPITAL, Victoria Park, E.2, Sat. and Sun. course in heart and lung diseases.

LEEDS GENERAL INFIRMARY.

TUESDAY.—3.30 P.M.—Dr. J. Burrow: Some Problems in Medical Diagnosis.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.

WEDNESDAY.—4.15 P.M. (Royal Samaritan Hospital for Women), Dr. Donald McIntyre: Uterine Tumours.

Births, Marriages, and Deaths

BIRTHS

BYROM.—On Jan. 21, at Birchington, the wife of Dr. F. B. Byrom—a son.

BYWORTH.—On Jan. 22, at Stanmore, Middlesex, the wife of Dr. Harold A. Byworth—a son.

CLARKE.—On Jan. 17, at Royal Avenue, Chelsea, the wife of Dr. R. F. Clarke—a son.

DEATHS

EYRE.—On Jan. 4, at Whitstable, Kent, Charles R. B. Eyre, M.R.C.S., aged 58.

FRASER.—On Jan. 23, William Aldridge Fraser, M.C., M.B. St. And., of St. Albans.

HENDERSON.—On Jan. 22, at Falmouth, Alexander Milne Henderson, M.D. Aberd., formerly of Highgate, London, in his 85th year.

HOULBROOK.—On Jan. 19, at Hathersage, William Edward Houlbrook, M.R.C.S., J.P., aged 60.

SINCLAIR.—On Jan. 23, Frederick Archibald Sinclair, M.B. Edin. of Jamaica, in his 78th year.

WARRACK.—On Jan. 24, at Gravesend, James Stratton Warrack, T.D., M.D. Aberd., D.P.H.

WOOLLARD.—On Jan. 18, at University College, London, Herbert Henry Woollard, M.D. Melb., F.R.S., aged 49.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Appointments

CLEMENS, KATHLEEN, M.B. Sydney, assistant bacteriologist in the public health laboratory, King's College, Newcastle-on-Tyne.

COLEMAN, MARK, M.S. Lond., F.R.C.S., surgical registrar at the London Chest Hospital.

ERSKINE-YOUNG, J. M., M.D. Lpool, D.P.H., assistant medical officer for Hove.

FROMOW, D. L., M.R.C.S., resident surgical officer at the Ingham Infirmary, South Shields.

GILLANDERS, A. D., M.B. Edin., resident medical officer at the City Isolation Hospital, Leicester.

HOTSON, JOHN, M.B. Edin., medical officer at the Babies Hospital, Newcastle-on-Tyne.

JONES, D. J., M.B. Wales, D.P.H., district medical officer of health for Brecon.

LINDAHL, J. W., M.Chir. Camb., F.R.C.S., registrar in the ear, nose, and throat department of the London Chest Hospital.

OLDFIELD, JOSIE M., M.R.C.S., junior assistant maternity and child welfare medical officer for Greenwich.

RAVEN, R. W., F.R.C.S., assistant surgeon to the Royal Cancer Hospital (Free), London.

SEMPLE, A. B., M.B. Glasg., D.P.H., assistant medical officer of health and assistant school medical officer for Blackburn.

YOUNG, G. CAMPBELL, M.R.C.S., D.P.M., deputy medical superintendent at Bracebridge Heath Hospital, Lincoln.

ZIEYE, I. E., M.A. Cape Town, F.R.C.S., resident medical officer at East Ham Memorial Hospital.

General Post Office.—The following appointments are announced:—

PARKS, J. W., M.B. Camb., D.C.H., male assistant medical officer at headquarters medical branch;

MAY, OLIVE S., M.R.C.S., assistant woman medical officer; and

CHRYSTALL, DOROTHY M., M.B. Aberd., assistant woman medical officer.

Examining Surgeons under the Factories Act, 1937: Dr. J. L. RENTOUL (Bridge-of-Weir District, Renfrew); Dr. D. T. KEMP (Mauchline District, Ayr); Dr. R. D. SUMMERS (Bethnal Green District, London).

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Infirmary.—Res. anæsthetist, £150.
Barnsley, Beckett Hosp. and Dispensary.—H.P., £150.
Bermondsey Borough.—Asst. M.O., £600.
Birmingham, Erdington House.—Asst. res. M.O., £300.
Birmingham New Centre Hosp.—Asst. to radiological dept., £400.
Blackburn Royal Infirmary.—Res. H.S., £175.
Bristol, Barrow Hosp. for Nervous and Mental Diseases.—Res. H.P., at rate of £200.
Cambridge, Addenbrooke's Hosp.—H.S. to special depts. at rate of £130.
*Central London Ophthalmic Hosp., Judd Street, W.C.*1.—Hon. asst. physician.
*Central London Throat, Nose, and Ear Hosp., Gray's Inn Road, W.C.*1.—Hon. assts. in out-patient dept.
*Central Middlesex County Hosp., Acton Lane, Willesden, N.W.*10. Physician (Grade II), £650.
Derby County.—Deputy county M.O.H., £840.
Derbyshire Royal Infirmary.—H.S. for gynæcological dept., £150.
*Dreadnought Hosp., Greenwich, S.E.*10.—Receiving-room officer, £150. Also hon. dermatologist.
Durham County Council.—Asst. school M.O., £500.
Durham County Hosp.—H.S., at rate of £150.
Ealing, King Edward Memorial Hospital.—Cas. O. and H.S., at rate of £150.
East Ham Memorial Hosp., Shrewsbury Road, E.7.—H.P., at rate of £150.
*Elizabeth Garrett Anderson Hosp., Euston Road, N.W.*1.—Hon. asst. to ear, nose, and throat dept.
Enfield Urban District Council.—Consultative obstetrician, 2½ guineas per session.
Essex County Council and Corporation of Chingford.—Asst. county M.O. and M.O.H., £400.
Gloucester Royal Infirmary.—Asst. to radiological dept., £500.
Hampshire County Council, &c.—Asst. county M.O., &c., £800.
Hosp. for Sick Children, Great Ormond Street.—Res. med. asst. and clin. pathologist, £125.
Hounslow Hosp., Middlesex.—Anæsthetist, £1 1s. per session.
Huddersfield, St. Luke's Hosp.—Res. M.O., £230.
Hull Royal Infirmary.—Second cas. O, at rate of £150.
Ilford, King George Hosp.—Hon. anæsthetist.
Inverness, Royal Northern Infirmary.—Two H.P.'s, each £100.
Kent Education Committee.—Temp. asst. school M.O., £11 a week.
Lancaster, Royal Infirmary.—Cas. O. and orthopædic H.S., at rate of £130. Jun. H.S., at rate of £130. Also locum to H.S., 1 guinea per day.
Lancaster County Mental Hosp.—Asst. M.O., £550.
Leamington Spa, Warneford General Hosp.—Res. cas. O. and H.S., at rate of £150.
Leyton Borough.—Deputy M.O.H. and deputy school M.O., £750.
Liverpool Hosp. for Consumption and Diseases of the Chest, Mount Pleasant.—Hon. physician.
*London Chest Hosp., Victoria Park, E.*2.—H.P., at rate of £100.
London County Council.—Asst. M.O.'s Class I, each £350. Also asst. M.O.'s Class II, each £250.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester Ancoats Hosp.—Radiological officer, £400.
Manchester Royal Children's Hosp., Pendlebury.—Res. surg. O., at rate of £150.
Mitcham, Cumberland House Hosp.—Res. asst. M.O., £350.
*National Hosp., Queen Square, W.C.*1.—H.S., £100.
Paris, Hertford British Hosp.—Res. M.O., £150.
Portsmouth City.—Res. M.O. at Infectious Diseases Hospital and asst. M.O.H., £500.
Portsmouth Royal Hosp.—Cas. O., at rate of £130.
*Princess Elizabeth of York Hosp. for Children, Shadwell, E.*1.—Hon. radiologist for X ray and electro-therapeutical dept.
*Queen's Hosp. for Children, Hackney Road, E.*2.—H.S., and cas. O., each at rate of £100.
*Radium Institute, Riding House Street, W.*1.—Res. M.O., at rate of £250.
Richmond Borough, Surrey.—Asst. M.O.H., £500.
Rochdale Infirmary and Dispensary.—H.P., £150.
*Royal Dental Hosp. of London School of Dental Surgery, 32, Leicester Square, W.C.*2.—Lecturer on pharmacology and materia medica.
*Royal Free Hosp., Gray's Inn Road, W.C.*1.—Asst. M.O. in V.D. dept., £300.
***Royal Naval Medical Service.*—M.O.'s.**
*Royal Northern Hosp., Holloway, N.*7.—H.P., at rate of £70.
*St. Bartholomew's Hosp., E.C.*1.—Helen Cave Memorial Scholarship, £200.
*St. George's Hosp., S.W.*1.—Res. asst. physician, £250. Surgeon. Also asst. surgeon.
*St. John's Hosp., Lewisham, S.E.*13.—Res. cas. O., at rate of £100.
*St. Mary's Hosp., W.*2.—Res. anæsthetist, at rate of £125.
*Saint Mary's Hosp. for Women and Children, Plaistow, E.*13.—Res. surg. O. and res. H.P., at rates of £155 and £150 respectively.
Salisbury General Infirmary, Wilts.—Two H.S.'s, each at rate of £125.
Sheffield, Jessop Hosp. for Women.—Res. anæsthetist, at rate of £100.
*South London Hosp. for Women, Clapham Common, S.W.*4.—H.S., at rate of £100. Also clin. asst.
Southampton Children's Hosp. and Dispensary for Women.—Res. M.O., at rate of £150.
Walsall General Hosp.—Cas. H.S., at rate of £150.
Ware Park Sanatorium.—Asst. M.O., £300.
*West End Hosp. for Nervous Diseases, Gloucester Gate, N.W.*1.—Two res. H.P.'s, each at rate of £125.
West Ham County Borough, Education Department.—Sen. school dental officer, £600.
*West London Hosp., Hammersmith Road, W.*6.—Res. surg. reg. and tutor, £225.
*West London Hosp. Medical School, W.*6.—Lecturer in forensic medicine.
West Riding of Yorkshire County Council, Public Health Laboratory.—Asst. bacteriologist, £500.
Wolverhampton Royal Hosp.—Res. anæsthetist, and H.S. for fracture and orthopædic dept., at rates of £200 and £100 respectively.
York County Hosp.—H.P., £150.

The Chief Inspector of Factories announces vacancies for Examining Factory Surgeons at Felton (Northumberland), Crawley (Sussex), Redruth (Cornwall), Ramsey (Hunts), Burgess Hill (Sussex), Wilmslow (Chester), Cullen (Banff), Bankfoot (Perth), and Fortrose (Ross and Cromarty).

Medical Referee under the Workmen's Compensation Act, 1925, for the Bourne, Oakham, and Stamford County Court Districts (Circuit No. 20). Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before Feb. 10th.

SENSORY CHANGES IN DYSTROPHIA MYOTONICA

O. Maas has examined the disturbances of sensibility in 28 patients aged from thirteen to fifty-five suffering from dystrophia myotonica (*Brain*, 1938, **61**, 449). Of these, 20 showed an acuity of the vibration sensation less than normal, the impairment being greatest at the wrist and less at the knee and ankle. There was no constant relationship between the severity of myotonia and muscular wasting on the one hand and the presence or degree of impairment of vibration sensation on the other. It appeared therefore that about two-thirds of the cases showed signs of impaired vibration sensation but none of them presented any abnormality of cutaneous sensibility (tactile or painful). Routine examination of a large number of other cases of dystrophia myotonica revealed other sensory abnormalities such as hypæsthesia, hypalgesia, or hypotherm anæsthesia. Whether these changes are due to peripheral or cerebral nervous lesions cannot at present be determined. Maas concludes that the frequency of signs of sensory change in dystrophia myotonica suggests that the disease is not solely the result of an affection of the muscles.

NOTES, COMMENTS, AND ABSTRACTS

ACUTE EPIDEMIC DISEASES AMONG ESKIMOS IN ANGMAGSSALIK

BY ARNE HØYGAARD, M.D.

(From the Institute of Physiology, Oslo University)

IT is reported from many isolated settlements that when newcomers arrive the local inhabitants catch a cold. Abs (1930) has called attention to the fact that, when people from one mining settlement in Spitzbergen visit people at another station in the spring, epidemics of catarrhal infections develop. This happens *before* the first ship has arrived after the winter isolation. It is also well known that outbreaks of "influenza" are often seen among Indian and Eskimo tribes and are as a rule very serious.

This article records experience gained at Angmagssalik in East Greenland (lat. 65½° N.) by the scientific expedition planned and equipped by Oslo University mainly to investigate the nutrition and metabolism of the Angmagssalik Eskimo.

DISEASES AT ANGMAGSSALIK

About 800 Eskimos live in Angmagssalik, and they are, as far as we know, still of unmixed Eskimo blood. The people living near the trading post have more and more forsaken their primitive diet, but the main population still lives in small communities on the coast by hunting seals and fishing. The Danish physician Poulsen (1909) wintered in Angmagssalik 1899–1900. He did not see any case of pneumonia, but there were some cases of bronchitis. Since the colonisation of Angmagssalik in 1895 there have always been outbreaks of colds when the annual ship arrived, and at intervals of 5–10 years there have been epidemics of "influenza" in connexion with the ship's annual visit in July, August, or September. Bertelsen (1935) reported that 40 per cent. of the deaths in the colony happened in August and September. Statistics based on observations made by the governor and the minister from 1911 to 1930 show that 30 per cent. of all deaths in this period were caused by "inflammation in the chest and epidemics" (Mikkelsen 1934). Deaths from "tuberculosis and pneumonia" were calculated as only 6·5 per cent. of all deaths.

In the spring *before* the annual ship arrives infectious diarrhœa is common, attacking both children and adults but without any serious course. Before the ship arrives, when people from isolated settlements meet in the spring, colds are common but not so widespread and of such a long duration as the annual epidemics of colds after the ship's arrival. In August–November, 1925, an outbreak of poliomyelitis swept the coast, and twenty-seven of the Eskimos died. Impetigo contagiosa and abscesses on the trunk (especially the shoulders) often occur as epidemics.

The outbreak of the serious epidemic of "influenza" started in November, 1935, more than two months after the ship had left Angmagssalik. It spread rapidly through the district along the travelling routes, but did not reach communities cut off from communication with other places where people were ill. The peak came in January, 1936, and from then until the summer of 1936 there were sporadic cases of pneumonia in different places. Nearly 10 per cent. of the population died.

DISCUSSION

The absence of hygiene among Eskimos makes it likely that everybody in Angmagssalik is infected when the ship arrives. They live at that time for weeks together at the trading post and in nearby hunting grounds. The question therefore arises why the epidemic did not break out until two months after the ship had left (the incubation period of the illness being not more than a week). I have shown (Høygaard 1938) that tuberculosis at the trading post is very badly influenced by the "hungertime" which starts in mid-winter. Captain Ejnar Mikkelsen, the Danish explorer who wintered in Angmagssalik 1937–38, said in a lecture at the Royal Anthropological Institute in London on Oct. 25, 1938, that he considered that hardships and lack of food in the autumn reduced the general state of health of the Eskimos, and that this was the reason why the "influenza" began after a latent interval (from the coming of the ship). I think that this explanation is a little unsatisfactory. As a matter of fact, the epidemic of 1935 started at a time when food conditions were rather good, and in some communities there was a full store of provisions. The famine in the winter 1935–36 was, I am sure, mainly secondary, and the "influenza" primary.

From European experience we know that people can be quite healthy with pathogenic micro-organisms in the throat or the nose, and that such micro-organisms increase in virulence by passage. In my opinion the outbreak in Angmagssalik must be explained in this way. Perhaps the virus came from the crew of the visiting ship. By passage it grew virulent, until in November the great epidemic started. This is sufficient to explain the latent period. It is all the more probable because Wells and Heinbecker (1932) observed that the bacterial flora of the throats of Eskimos from Thule closely resembled that of Europeans. This observation was made before the annual arrival of the ship.

Adolf Hoel, the Norwegian explorer, told me that it was the usual experience of Arctic expeditions under his leadership for the people to catch a cold on returning from journeys in the Arctic even of so short a duration of 3–4 months. I experienced the same thing later. As a rule it may be said that this infection after a short isolation is milder and shorter than infection after a whole year's isolation. This is the common experience in Angmagssalik (personal communication from the minister, Otto Rosing).

Another reason for the severity of the outbreak is, as stated by Captain Mikkelsen, that the Eskimos take very little care when ill. The young hunters do not stop working before they are absolutely unable to walk. This is especially so in the autumn, when they are anticipating the middle of the winter when very often no catch can be made. I once met an Eskimo in a kayak who felt ill, and my examination showed a definite pneumonia with high fever and infiltration in one lung. He had to paddle his kayak for hours before he could reach his home, and by that time he would be both wet and cold. On the other hand, it was impossible to keep convalescents in their houses. Before they had recovered from their

pneumonia they could be seen fishing on the ice for hours with very miserable footwear or starting for a hunting trip in their kayaks. These actions may lead to complications, such as empyema, which was very common. We certainly can see here one of the reasons why many of the deaths were of young hunters.

I had the impression that the temperature of Eskimos with croupous pneumonia was not so high as is usual in Europeans. The illness started less violently and was seldom accompanied by severe rigors. I saw neither herpes labialis nor the rusty sputum which is so common in European pneumonia. In some cases there were traces of fresh blood in the sputum, and in one case I saw a real hæmoptysis, with blood running out from nose and mouth. Tuberculosis was excluded, the Pirquet reaction being negative on three occasions. The Eskimos in Angmagssalik seem to have the same low resistance against influenza as have all primitive peoples. On the other hand they seem to have a high resistance against sore-throat and tonsillar infections. I never saw tonsillitis, sore-throat, peritonsillitis, or hypertrophic tonsils in any of the Eskimos. The Europeans, however, often get sore-throat when the ship arrives. The epidemic of poliomyelitis among the Eskimos in 1925 affected children less than adults. Measles, scarlet fever, whooping-cough, German measles, mumps, smallpox, chickenpox, and diphtheria do not seem to have been recorded in Angmagssalik, and—*mirabile dictu*—I did not see a single case of venereal disease. The most striking example of the difference in immunity between Eskimos and Europeans is *spekkfinger*, a characteristic form of whitlows (Mathiesen et al. 1935), which European seal-hunters very often get but the Eskimos of Greenland never. Acne vulgaris, so common among Europeans, was never seen at Angmagssalik.

H. and I. Jones (1928) claim that Eskimos are naturally immune against diphtheria; but Boas (1885) described an outbreak very like diphtheria among the central Eskimos, and Wells and Heinbecker (1932) showed that 50 per cent. of some Eskimos had a positive Schick reaction and they found in the throats of Eskimos organisms very like diphtheria bacilli. From the west coast of Greenland Bertelsen (1935) reports several epidemic diseases, including gonorrhœa, typhoid, paratyphoid, paradysentery, erysipelas, whooping-cough, poliomyelitis, and epidemic jaundice. But the Eskimos of the west coast are to a great extent a mixed race and have exchanged their native diet for imported foreign foods, such as cereals and sugar. Their connexion with white men is much older (250 years) and more intimate than at Angmagssalik. Not very much is known about the correlation between race, diet, and infections, but in my opinion further studies in this matter would be very interesting. Epidemiologists who want to carry out such research on carnivorous unmixed races must do it now. In a few years nature's gigantic experiment with men on a pure animal diet will be spoilt by civilisation.

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LYMPHOGRANULOMA VENEREUM

THE accumulation of material for the study of lymphogranuloma venereum (lymphogranuloma inguinale, poradenitis venerea, lymphopathia venerea, or climatic bubo) proceeds apace. Pardo-Castelló, Ferrer, Ibarra, and Tiant review 285 cases and conclude that, allowance being made for wrong diagnoses in the past, there has been an extraordinary increase in this disease in Cuba in the past few years (*Vida Nueva*, 1938, **42**, 465). Of the 285 cases 141 were in Europeans, 143 in negroes, and 1 in an Asiatic. The youngest patient was a boy of thirteen and the oldest a man of seventy-three. Struck by the overwhelming incidence in males (250 men to 35 women), they thought it possible that women might act as carriers; so they performed Frei's test as a routine on all women admitted for syphilitic and other skin diseases to the Calixto Garcia Hospital in Havana. In not one case was it positive. But they quote Di Gregorio and his colleagues as having found 10–43 per cent. of positive Frei's tests in prostitutes without symptoms of the active disease. They also say that Tarafa has proved in 3 cases that a woman with the genitorectal syndrome can have sexual relations with several men without infecting them. Of 10,310 patients admitted for syphilis or skin diseases, 2·39 per cent. had lymphogranuloma venereum, 21·33 per cent. syphilis, 4·73 per cent. chancroid, and 20·75 per cent. gonorrhœa. Three types of anorectal lesion were found—simple stricture, stricture with inflammation of the rectum, and proliferating rectal granulomatosis—and the three were sometimes mixed. A note of warning is added that the mistake should not be made of thinking that all rectal stenosis and all rectovaginal ulceration are lymphogranulomatous. Syphilis, tuberculosis, trauma, cancer, and chronic inflammation can produce rectal stenosis with or without fistulæ. What can be stated dogmatically is that stenosis low down in the rectum with infiltration of the rectal wall is always lymphogranulomatous and can be proved to be such by Frei's test.

Pardo-Castelló and his colleagues are not at all optimistic about treatment. They tried antimony, Solganal B, Frei's antigen, intravenous injections of sodium salicylate, and radiotherapy. None of these remedies gave consistent results. In a few cases antimony, pushed till it caused articular pains, appeared to give the best results, but in some cases it was a complete failure. Injections of sodium salicylate were of little value. Frei's antigen, given either intradermally or intravenously, was by no means a specific remedy. Radiotherapy was an excellent coadjuvant, especially in prolonged adenitis. As controls, Tiant and Ibarra treated some of their patients solely with absolute rest in bed and symptomatically. They found improvement just as rapid, and the length of the illness the same, as in patients receiving special medication. Sulphanilamide and similar chemotherapeutic agents do not appear to have been tried. F. O. MacCallum and G. M. Findlay have shown that sulphanilamide and a glucose derivative of 4 : 4′-diaminodiphenylsulphone can protect mice to some degree against active strains of the virus of lymphogranuloma inguinale (*Lancet*, 1938, **2**, 136). For the genitorectal syndrome the only sure treatment, according to the Cuban authors, is surgery. If the disease is well established and fistulæ are present, the rectum must be extirpated after colostomy. When there are no ulcers or fistulæ and the stricture is simple, life can be prolonged and the patient made more comfortable by repeated and progressive dilatation with rectal bougies.

TUBERCULOSIS IN NEWFOUNDLAND

IN the annual report of the Grenfell Society Dr. C. S. Curtis, medical superintendent of the hospital at St. Anthony, expresses concern at the prevalence of tuberculosis in Newfoundland. While economic conditions are steadily improving the

number of cases of phthisis seems to be increasing. The mortality-rate from tuberculosis is now 2 per 1000, the same as it was in the United States thirty years ago. Control is extremely difficult in this scattered population with no proper travel facilities, and a large number of people with active and open lesions are at large and a source of danger to their families and friends. More hospital beds are urgently needed both for early treatment and the isolation of chronic cases. Dr. Curtis would like authority to compel infectious patients, too poor or too ignorant to observe the rules of hygiene, to enter an institution.

BOURGEOIS BABIES

THOSE non-members who read the new edition of the little book written for the Chelsea Babies Club by its medical officers (Recipes for Food and Conduct. London: Chelsea Babies Club, 35, Danvers Street, Chelsea. 1938. Pp. 84. 2*s*. 6*d*.) will envy the children and mothers of the professional classes in Chelsea who can enjoy advice and help of a type hitherto reserved for the working-class at welfare centres. The book consists of sixteen short chapters on prenatal care, breast-feeding, weaning, diet, exercise, clothing, and general management. Simply written, so that directions can be followed by those unused to medical terms, it yet contains the essentials of modern pædiatrics. The directions for prenatal care are practical and unalarming; the rules for breast-feeding are excellent, keeping the balance between the need for regularity and the avoidance of depressing monotony in the mother's life. Simple directions are given for calculating the amount of breast-milk required by the infant and methods of test-weighing are given in detail. Weaning, balanced diets, vitamins, patent foods, and protective inoculation are sensibly reviewed and the essential differences between the various commercial milks sold and the dangers of raw milk are made clear. The modern views on sound tooth formation are embodied in the warning against excess of cereals in the diet. There is an excellent chapter on exercise in infancy, with a sympathetic plea for babies too much confined to play-pens or strapped into perambulators with little possibility of either physical or mental exercise. The section on sun-bathing contains a salutary warning against over-enthusiastic exposure, especially at the seaside. The book throughout is balanced in outlook and the apt quotations from the works of the sixteenth-century French physician, Saint-Martin, add to its attractiveness. Many medical readers will find instruction in it.

CATALOGUING IN SPECIAL LIBRARIES

Mr. J. L. Thornton, the librarian of St. Bartholomew's Hospital medical college, has made a concise survey of the methods of cataloguing adopted in the "special" libraries in this country (London: Grafton and Co. 1938. Pp. 268. 10*s*. 6*d*.). He uses the term special to indicate all other than public and county libraries, and he covers the large field comprehensively though without pretence to completeness. Although the book is intended to deal mainly with one particular branch of librarianship—cataloguing—Mr. Thornton manages to include a mass of useful information on other aspects of the subject in many of the sections devoted to individual libraries. Beginning with the university and college libraries, he goes on to discuss in turn medical and scientific libraries (such as those of St. Bart.'s, the School of Hygiene, and the Royal College of Surgeons); those attached to scientific and learned institutions and societies; government libraries; business, commercial, and technical libraries; and finally polytechnic and other libraries catering for the more general types of student. At present the methods of cataloguing are widely divergent and the achievement of a satisfactory degree of coöperation and uniformity amongst such a varied collection of libraries will be no easy task. Yet this is what Mr. Thornton is aiming at, and if his book succeeds even partially in making order out of chaos it will have performed a useful service. The book may not interest every doctor, but those who are constantly using scientific libraries, and more particularly the special librarians themselves, will find it rich meat.

THORACIC SURGICAL IMPLEMENTS

IN a lecture given to the Institute of British Surgical Technicians on Jan. 20, Mr. T. HOLMES SELLORS said that his object was to try to help bridge the gap between the user and the maker of surgical implements. Thoracic surgery was an extremely specialised branch requiring special tools. *Rib resection* involved freeing of the bone from its attached soft tissues without injuring the pleura or lung. All rib rugines, raspatories, or strippers were based on the Farabœuf periosteal elevator. The short curved stripper generally sufficed, but modifications were necessary in dealing with a rib hidden deep beneath muscle or under the scapula, and the angle at which the rib lay in relation to the operator determined the shape of other forms. Another tool, which was needed to reach the deep surface of the rib, was the Doyen raspatory, invented fifty years ago and never since improved, except by cranking the handle or changing the size of the hook. The rib, after being freed, had to be cut. Rib shears fell into two main types: guillotine and forceps. The guillotine type with a hook or a complete ring made a clean true cut, but could not be used round corners. In these circumstances, or when the rib was unduly tough, the compound double-action Swedish patterns were invaluable. There were also punch and gouge forceps for clearing sharp or projecting stumps of bone.

After resection of the rib the opening had to be enlarged with a *rib spreader*, generally based on the Tuffier or the De Quervain types, to allow of intrathoracic manipulations, for which the instruments had to be longer and lighter than usual and safe from any chance of springing or slipping off. The tying of *ligatures* constituted a problem, and for this reason most forceps were curved to let the surgeon see the tips. There were two ways of controlling the thin-walled vessels at the hilum: (1) isolating each vessel tediously and ligaturing it, and (2) grasping vessels and bronchi together in a special snare or tourniquet, which was left in place until stitches could be slipped round the vessels and lung stump.

Lighting the operation field was sometimes a problem. The big shadowless or multiple-unit lights were valueless. Lighted retractors or a small lamp were almost essential. With reference to thoracoscopes, bronchoscopes, and all other electrical implements Mr. Sellors emphasised the possibility of a breakdown due to faulty cable or to a lamp blowing out. There was one motto: "Duplicate everything." Electrical connexions should be more or less standardised.

The *operating-table* as used in general surgery was too high for chest work. The patient lay on his side for most of the thoracic procedures, and it was difficult for the surgeon to stand over the operation field without using a platform. A lower base was now being fitted on many tables for this reason, with fittings to keep the patient on his side.

One of the latest problems to be solved was that of *continuous suction* needed in the treatment of chronic empyema. Hand-pumps and water siphonage were not wholly efficient. Electric suction was the only feasible method, and a small, low-consumption, silent, and reliable motor had been produced. He had had one "ticking over" continuously for six months.

Mr. Sellors ended with a plea for the invention of a substitute for rubber tubing—something with thin walls and an effective lumen, flexible, and not hard enough to erode the tissues. He also put forward the "hopeless request" for an instrument that would tie a half-hitch knot round the tip of a curved forceps at a good distance from the surgeon's fingers.

AMERICAN MEDICAL PIONEERS

UNDER a somewhat vague title (Doctors on Horseback. William Heinemann. 1938. Pp. 336. 16s.) Mr. James Thomas Flexner has written seven short and entertaining biographies of outstanding figures in American medicine during the eighteenth and nineteenth centuries. Here is the story of John Morgan, striving tirelessly, if tactlessly, to improve the standard of medical education, and of his lifelong and bitter rivalry with the younger Shippen; of the enigmatical Benjamin Rush, oddly compounded of benevolence and self-will, whose influence in American medicine was paramount for half a century; and of the heroic Ephraim McDowell who dared the first oöphorectomy with a mob waiting outside to hang him if he failed—dramatic surgery indeed. Next comes the tale of William Beaumont who dressed the stomach wound of a young man expecting him to die. When the patient survived with a gastric fistula, Beaumont was given a heaven-sent chance, of which he fully availed himself, to study gastric secretion and digestion. Daniel Drake, the "medical statesman" of Cincinnati, comes next, and the last essay tells of Crawford W. Long and William T. G. Morton who share the credit for the introduction of anæsthesia. Mr. Flexner writes racily and in no blindly partisan spirit. Being fully alive to the shortcomings of his various heroes, his records bear that stamp of fidelity and truth so essential to good biography.

CRIMINAL INVESTIGATION

THE scientific investigation of crime has two principal aspects, a study of the circumstances which is primarily the duty of the police, and the subsequent examination by experts of materials relating to the case—of bodies, remains, stains, dirt, fibres, documents, and writing, bullets, powders, tools, and coins—examinations that demand high degrees of special training. Sifting of such evidence by the coroner, the judge, the magistrate, the barrister, and the doctor requires a comprehensive though superficial knowledge of the entire field of criminal investigation, and it is this kind of knowledge that Söderman and O'Connell try to convey in their new book.[1] They succeed in covering the wide field in a remarkably thorough manner, free from redundance of any kind, and with a comforting assumption of the reader's intelligence. Their short treatise is designed for the detective, and, coming as it does from the combined sources of Stockholm and New York, it provides a refreshing stream of new observations, new methods, and new techniques. It should be added without delay to the shelves of every doctor-barrister and forensic pathologist.

THE DRUG TRAFFIC

THE report of the Central Opium Board on its work during 1938, and the statistics of narcotics for 1937, presented to the council of the League of Nations, are for the most part reassuring but in some respects disquieting. The board has now been in existence for ten years and is in a position to review the progress accomplished as well as to invite attention to "the weaknesses that practice has revealed in the Narcotics Conventions, and the chief dangers ahead."

Control of international traffic has been tightened and the escape into illicit traffic of manufactured drugs, it is claimed, has all but ceased. On the other hand "for raw materials, especially opium, the same cannot be said." Huge discrepancies have often been discovered between the amounts reported as having been shipped to various countries and the amounts received by them. This is doubtless attributable partly to the fact that not all the great opium-producing countries are parties to the opium conventions but also to the authorised continuance of opium-smoking in the Far East. Opium for this purpose is sold by government at a high profit, smuggling is accordingly promoted, and "opium sold by a government has precisely the same effect on the consumer as opium sold by a smuggler." Attention has been directed to the case of Manchukuo, a great opium-producing country and generally believed to be manufacturing large quantities of narcotic drugs. It, however, does not furnish any statistics to the board. Italy again has not since the second quarter of 1937 sent in any statistics whatever, although in 1936 1335 kg. was manufactured there.

The report says: "there can be no doubt that tens of thousands of drug addicts are still to be found in the world" and that "it is unlikely that more than a very small proportion of these drugs come from licensed premises, unless the statistics furnished to the Board are entirely incorrect." The board dismisses that suggestion and arrives at the conclusion that the large quantities of drugs found in the illicit traffic must mostly be produced in clandestine factories. There is no doubt that "immense quantities of opium are produced yearly for which there is no legitimate demand," and the conclusion is irresistible that "until the quantity of opium produced throughout the world is reduced to the amount needed for legitimate purposes the illicit traffic will continue."

The board reflecting on its work during the past decade cannot close without some misgivings about the future. It says: "the illicit traffic is a menace to the whole world, and can only be suppressed by universal coöperation. It would be most unfortunate if the great advance that has already been made towards the suppression of this traffic should be endangered by political disagreements. The Board thinks, therefore, that it would be well for the contracting parties to consider carefully what steps should be taken to keep, or win back, for the Board the full support of countries which are estranged from the League of Nations."

YEARBOOK OF LEARNED SOCIETIES

IN its fifty-fifth year the "Official Year-Book of the Scientific and Learned Societies of Great Britain and Ireland" (London: Charles Griffin and Co. Pp. 171. 10s.) continues to be an invaluable source of information, more particularly for those who have to do with the production of scientific journals. It contains details of the officers, objects, membership regulations, time and place of meetings, publications, and so on of the main societies in which original work is done, as well as particulars of such institutions as the Ministry of Health and the Medical Research Council.

THE DOCTOR'S VIEWS.—Many of the general public believe that the General Medical Council may strike a doctor off its register for practising unorthodox methods. It is useful therefore to have *Picture Post* pointing out, in its issue of Jan. 14 (p. 64), that the council is expressly forbidden to do so by the Medical Act. A man who has had a proper medical training is assumed to be competent of judging for himself what form of treatment is best for his patients. There is much other good sense in the article.

THE LANCET Index and Title-page to Vol. II, 1938, which was completed with the issue of Dec. 31, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

[1] Modern Criminal Investigation. By H. Söderman, D.Sc., head of the Institute of Police Science, University of Stockholm; and J. J. O'Connell, deputy chief inspector, New York City Police Department. London: G. Bell and Sons. 1938. Pp. 461. 12s. 6d.